SHARP SERVICE MANUAL

S3905R890PKS

MICROWAVE OVEN WITH GRILL AND CONVECTION

MODELS R-890SLM

In interests of user-safety the oven should be restored to its original condition and only parts identical to those specified should be used.

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SHARP CORPORATION

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The contents are subject to change without notice.

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Parts List

CHAPTER 1. BEFORE SERVICING

[1] GENERAL IMPORTANT INFORMATION

This Manual has been prepared to provide Sharp Corp. Service engineers with Operation and Service Information.

It is recommended that service engineers carefully study the entire text of this manual, so they will be qualified to render satisfactory customer service.

WARNING: THIS APPLIANCE MUST BE EARTHED

IMPORTANT

THE WIRES IN THIS MAINS LEAD ARE COLOURED IN ACCORDANCE WITH THE FOLLOWING CODE:

GREEN-AND-YELLOW---------- EARTH

BLUE ---------- NEUTRAL

BROWN----------LIVE

[2] WARNING MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from the magnetron or other microwave generating devices if it is improperly used or connected. All input and output microwave connections, waveguides, flanges and gaskets must be secured. Never operate the device without a microwave energy absorbing load attached.

Never look into an open waveguide or antenna while the device is energized.

[3] WARNING

Never operate the oven until the following points are ensured.

(A) The door is tightly closed.

(B) The door brackets and hinges are not defective.

(C) The door packing is not damaged.

(D) The door is not deformed or warped.

(E) There is not any other visible damage with the oven.

Servicing and repair work must be carried out only by trained service engineers.

All the parts marked "⚠" on parts list are used at voltage more than 250V.

Removal of the outer wrap gives access to potential above 250V.

All the parts marked "*" on parts list may cause undue microwave exposure, by themselves, or when they are damaged, loosened or removed.

Never operate the Grill and/ or Convection heater with the oven outer cabinet removed. (Because air flow is eliminated, and the excess heat generated on adjacent components). **It can cause permanent damage or a fire.**

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CHAPTER 2. WARNING TO SERVICE PERSONNEL

Microwave ovens contain circuitry capable of producing very high voltage and current, contact with any part of the high voltage circuit will result in electrocution. High voltage capacitor, Power transformer, Magnetron, High voltage rectifier assembly, High voltage fuse, High voltage harness.

REMEMBER TO CHECK 3D

1) Disconnect the supply.
2) Door opened, and wedged open.
3) Discharge the high voltage capacitor.

WARNING: AGAINST THE CHARGE OF THE HIGH VOLTAGE CAPACITOR

The high-voltage capacitor remains charged about 60 seconds after the oven has been switched off. Wait for 60 seconds and then short-circuit the connection of the high voltag capacitor (that is, of the connecting lead of the high-voltage rectifier) against the chassis with the use of an insulated screwdriver.

Sharp recommend that wherever possible fault-finding is carried out with the supply disconnected. It may, in some cases, be necessary to connect the supply after the outer case has been removed, in this event carry out 3D checks and then disconnect the leads to the primary of the power transformer. Ensure that these leads remain isolated from other components and the oven chassis. (Use insulation tape if necessary.) When the testing is completed, carry out 3D checks and reconnect the leads to the primary of the power transformer.

REMEMBER TO CHECK 4R

1) Reconnect all leads removed from components during testing.
2) Replace the outer case (cabinet).
3) Reconnect the supply.
4) Run the oven. Check all functions.

Microwave ovens should not be run empty. To test for the presence of microwave energy within a cavity, place a cup of cold water on the oven turntable, close the door and set the power level to HIGH (100%). And set the microwave timer for two (2) minutes. When the two minutes has elapsed (timer at zero) carefully check that the water is now hot. If the water remains cold, carry out 3D checks and re-examine the connections to the component being tested.

When all service work is completed and the oven is fully assembled, the microwave power output should be checked and microwave leakage test should be carried out.

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CHAPTER 3. PRODUCT SPECIFICATIONS

[1] SPECIFICATION

ITEM	DESCRIPTION
Power Requirements	230 - 240 Volts / 50 Hertz / Single phase, 3 wire earthed
Power Consumption	Microwave cooking 1.50 kW Approx. 6.5A
	Convection cooking 1.91 kW Approx. 8.0 A
	Grill cooking: Top Grill mode ---------- 1.25kW Approx. 5.2A Bottom Grill mode ---------- 0.70kW Approx. 2.9A Top and Bottom mode ---------- 1.90kW Approx. 7.9A
	Combi cooking: Micro and Top Grill ---------- 2.70kW Approx. 11.5A Micro and Bottom Grill ----------2.15kW Approx. 9.2A Micro and Convection ---------- 2.16kW Approx. 9.3A
Power Output	900 watts nominal of RF microwave energy (IEC60705 Test Procedure) Operating frequency 2450 MHz
Top Grill heating element Power Output	1200W
Bottom heating element Power Output	650W
Outer Case Dimensions	Width 520 mm Height 309 mm including foot Depth 683.5 mm **NOTE: The Depth does not include the door opening handle.**
Cooking Cavity Dimensions	Width 353 mm Height 207 mm Depth 357 mm **NOTE: Internal capacity is calculated by measuring maximum width, depth and height. Actual capacity for holding food is less.**
Turntable diameter	325 mm
Control Complement	Jog Touch Control System Clock (1:00 - 12:59) / Timer (0 - 99 minutes) Microwave Power for Variable Cooking Repetition Rate; 100P (HIGH) ..... Full power throughout the cooking time 70P (MEDIUM HIGH)..... approx. 70% of FULL Power 50P (MEDIUM)..... approx. 50% of FULL Power 30P (MEDIUM LOW)..... approx. 30% of FULL Power 10P (LOW) ..... approx. 10% of FULL Power Convection temperature control range: 250°C, 230°C, 220°C, 200°C, 180°C, 160°C, 130°C, 100°C, 70°C and 40°C EXPRESS COOK button EXPRESS DEFROST button ENTER button COMBI button MICRO POWER button GRILL button CONV.(°C) button QUICK&EASY button SHORT CUTS button INFO button AUTO COOK button AUTO MINUTE button STOP/CLEAR button KITCHEN TIMER/CLOCK button START button ENCODER dial ENTER button
Net Weight	Approx. 19 kg

As part of our policy of continuous improvement, we reserve the right to alter design and specifications without notice.

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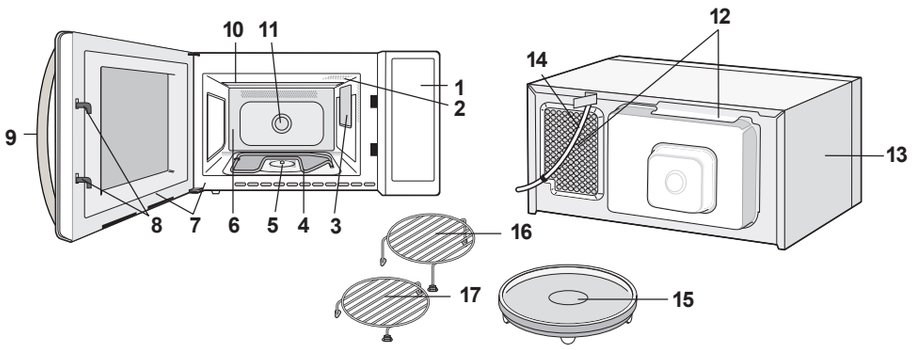
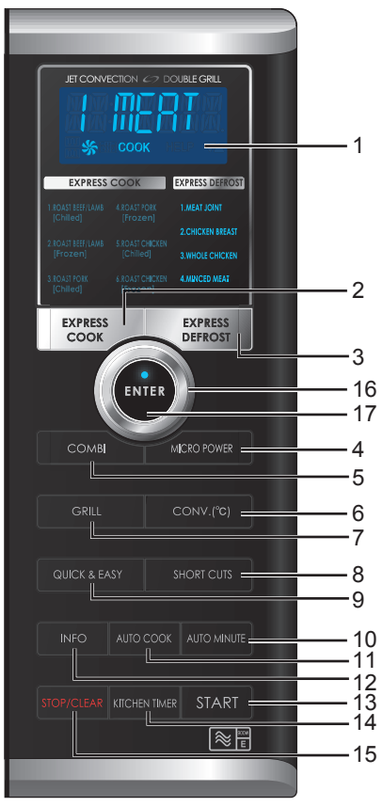
CHAPTER 4. APPEARANCE VIEW

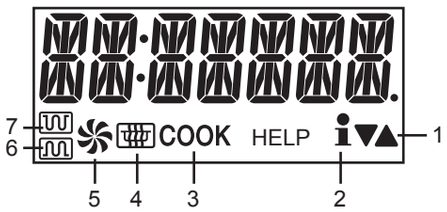
[1] OVEN

1. Control panel
2. Oven lamp
3. Waveguide cover
4. Bottom Grill heating element
5. Turntable motor shaft
6. Oven cavity
7. Door seals and sealing surfaces
8. Door latches
9. Door opening handle
10. Top Grill heating element
11. Convection fan
12. Ventilation openings
13. Outer case cabinet
14. Power cord
15. Turntable
16. High rack
17. Low rack



[2] TOUCH CONTROL PANEL





DIGITAL DISPLAY INDICATORS:
1. LESS/MORE
2. INFO
3. COOK
4. MICROWAVE
5. CONVECTION
6. BOTTOM GRILL
7. TOP GRILL

1. DIGITAL DISPLAY
   OPERATING BUTTONS:
2. EXPRESS COOK button
3. EXPRESS DEFROST buttons
4. MICRO POWER button
5. COMBI button
6. CONV.(ºC) button
7. GRILL button
8. SHORT CUTS button
9. QUICK & EASY button
10. AUTO MINUTE button
11. AUTO COOK button
12. INFO button
13. START button
14. KITCHEN TIMER button
15. STOP/CLEAR button
16. ENCODER dial
    Rotate the dial so that light show on menu
17. ENTER button

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CHAPTER 5. OPERATION SEQUENCE

[1] OFF CONDITION

Closing the door activates the monitored latch switch and the stop switch.

IMPORTANT

When the oven door is closed, the contacts COM-NC of the monitor switch must be open. When the microwave oven is plugged in a wall outlet (230 - 240V / 50Hz), the line voltage is supplied to the noise filter.

Figure O-1 on page 13-1

1. The control unit is not energized. The display shows nothing (Fig. O-1 (a)).
2. Open the door. The contacts (COM-NC) of the monitored latch switch are closed and the control unit is energized. Then contacts of relays RY1 and RY5 are closed, and the oven lamp will light and the display will show "ENERGY SAVE MODE TO CANCEL ENERGY SAVE MODE SET THE CLOCK" (Fig. O-1(b)).
3. Close the door. The contacts (COM-NC) of the monitored latch switch are opened and the contacts of relay RY1 are opened and the oven lamp will be turned off. The display will show " . 0". (Fig. O-1(c)).

NOTE: Energy save mode

1) If the oven has not been used for more than 3 minutes, the contacts of the relay RY5 will be opened and the control unit will be not energized. Open and close the door, the control unit will resume.
2) If the clock is set, this energy save mode does not work.

[2] MICROWAVE COOKING CONDITION

1. HIGH COOKING

Press MICRO POWER button. And enter the cooking time by rotate ENCODER dial. And start the oven by press START button.

Function sequence

Figure O-2 on page 13-2

CONNECTED COMPONENTS	RELAY
Oven lamp, Turntable motor	RY1
High voltage transformer	RY2
Fan motor,	RY6

1. The line voltage is supplied to the primary winding of the high voltage transformer. The voltage is converted to about 3.3 volts A.C. output on the filament winding and high voltage of approximately 2000 volts A.C. on the secondary winding.
2. The filament winding voltage (3.3 volts) heats the magnetron filament and the high voltage (2000 volts) is sent to the voltage doubling circuit, where it is doubled to negative voltage of approximately 4000 volts D.C..
3. The 2450 MHz microwave energy produced in the magnetron generates a wavelength of 12.24cm. This energy is channelled through the waveguide (transport channel) into the oven cavity, where the food is placed to be cooked.
4. When the cooking time is up, a signal tone is heard and the relays RY1 + RY2 + RY6 go back to their home position. The circuits to the oven lamp, high voltage transformer, fan motor and turntable motor are cut off.
5. When the oven door is opened during a cooking cycle, the switches come to the following condition.

SWITCH	CONTACT	CONDITION DURING COOKING	CONDITION DOOR OPEN (NO COOKING)
Monitored latch switch	COM-NO	Closed	Opened
	COM-NC	Opened	Closed
Stop switch	COM-NO	Closed	Opened
Monitor switch	COM-NO	Closed	Opened
	COM-NC	Opened	Closed

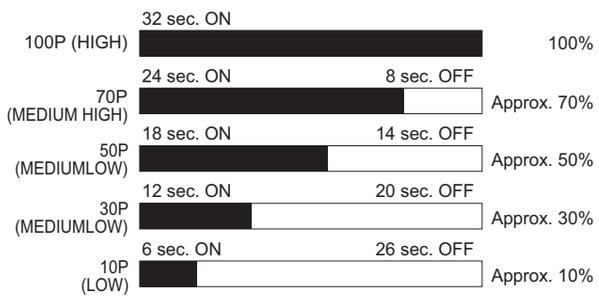
The circuit to the high voltage transformer is cut off when the contacts of relay RY2, and the contacts (COM-NO) of the monitored latch switch and monitor switch are made open. The circuit to the fan motor is cut off when the relay RY6 is made open. The circuit to the turntable motor is cut off when the contacts (COM-NO) of the monitored latch switch are made open. The relay RY2 and RY6 are made open when the door is opened. The oven lamp remains on even if the oven door is opened after the cooking cycle has been interrupted, because the relay RY1 stays closed. Shown in the display is remaining time.

6. MONITOR SWITCH CIRCUIT
   The monitor switch is mechanically controlled by the oven door, and monitors the operation of the monitored latch switch.
   1) When the oven door is opened during or after the cycle of a cooking program, the monitored latch switch and stop switch must open their contacts (COM-NO) first. After that the contacts (COM-NC) of the monitor switch and monitored latch can be closed.
   2) When the oven door is closed, the contacts (COM-NC) of the monitor switch SW3 must be opened and the contacts (COM-NO) of monitor switch must be closed. After that the contacts (COM-NO) of the monitored latch switch and the stop switch are made closed, and the contacts (COM-NC) of the monitored latch switch are made open.
   3) When the oven door is opened and the contacts (COM-NO) of the monitored latch switch remain closed, the fuse F8A will blow. Because the relay RY1 and monitor switch are closed and a short circuit is caused.

2. MEDIUM HIGH, MEDIUM, MEDIUM LOW, LOW COOKING

When the microwave oven is preset for variable cooking power, the line voltage is supplied to the high voltage transformer intermittently within a 32-second time base through the relay contact which is coupled with the current-limiting relay RY2. The following levels of microwave power are given.

SETTING;



NOTE: The ON/OFF time ratio does not exactly correspond to the percentage of microwave power, because approx. 3 seconds are needed for heating up the magnetron filament.

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[3] GRILL COOKING CONDITION

1. TOP GRILL (Figure O-3)

In this condition the food is cooked by the top grill heating element. Press GRILL button. And enter the cooking time by rotate ENCODER dial. When the START button is pressed, the following operation occur:

1. The numbers on the digital readout start the count down to zero.
2. The oven lamp, cooling fan motor and turntable motor are energized.
3. The relay RY3 is energized and the main supply voltage is applied to the top grill heating element.
4. Now, the food is cooked by the top grill heating element.

2. BOTTOM GRILL (Figure O-3b)

In this condition the food is cooked by bottom grill heating element energy. Press GRILL button 2 times. And enter the cooking time by rotate ENCODER dial. When the START button is pressed, the following operation occur:

1. The numbers on the digital readout start the count down to zero.
2. The oven lamp, cooling fan motor and turntable motor are energized.
3. The relay RY4 is energized and the main supply voltage is applied to the bottom grill heating element.
4. Now, the food is cooked by the bottom grill heating element.

3. TOP AND BOTTOM GRILLS (Figure O-3c)

In this condition the food is cooked by top and bottom grill heating elements energy. Press GRILL button 3 times. And enter the cooking time by rotate ENCODER dial. When the START button is pressed, the following operation occur:

1. The numbers on the digital readout start the count down to zero.
2. The oven lamp, cooling fan motor and turntable motor are energized.
3. The relay RY4 is energized and the main supply voltage is applied to the bottom grill heating element.
4. The relay RY3 is energized and the main supply voltage is applied to the top grill heating element.
5. Now, the food is cooked by the top and bottom grill heating elements.

[4] CONVECTION COOKING CONDITION

1. PRE-HEATING (Figure O-4)

Press CONV. (ºC) button for programme the desired convection temperature. When the INSTANT COOK/START button is touched, the following operations occur:

1. The coil shut-off relays RY1 and RY6 are energized, the oven lamp, cooling fan motor and turntable motor are turned on.
2. The coil shut-off relays RY3 and RY4 are energized by control unit and the main supply voltage is added to the top and bottom heating elements.
3. When the oven temperature reaches the selected pre-heat temperature, the following operations occur:
   1) The coil shut-off relays RY3 and RY4 are energized by control unit temperature circuit and thermistor, opening the circuit to the top and bottom grill heating elements.
   2) The oven will continue to function for 30 minutes, turning the top and bottom heating elements on and off, as needed to maintain the selected pre-heat temperature. The oven will shut-down completely after 30 minutes.

2. CONVECTION COOKING (Figure O-4)

When the pre-heat temperature is reached, a beep signal will sound indicating that the holding the temperature has been reached in the oven cavity. Open the door and place the food to cooked in the oven. Press CONV.(ºC) button. And enter the convection time by rotate ENCODER dial. When the START button is pressed, the following operation occur:

1. The numbers on the digital readout start the count down to zero.
2. The oven lamp, cooling fan motor, turntable motor and convection motor are energized.

NOTE: When the convection temperature 40°C is selected, the convection motor is not energized.

3. The relays RY3 and RY4 are energized (if the cavity temperature is lower than selected temperature) and the main supply voltage is applied to the top and bottom heating elements to return to the selected cooking temperature.
4. Upon completion of the cooking time, the audible signal will sound, and the oven lamp, turntable motor, cooling fan motor, convection motor, top and bottom heating elements are de-energized. At the end of convection cycle, if the cavity air temperature rise above 120°C, the circuit to the relay RY6 will be maintained (by the thermistor circuit) to continue operation of the cooling fan motor until temperature drops below 105°C, at that time the relay RY6 will be de-energized, turning off the fan motor.

[5] COMBI COOKING CONDITION

1. MICROWAVE AND CONVECTION (Figure O-5a)

Press MIX button 1 time. And enter the desired cooking time by rotating the ENCODER dial. And press MICRO POWER button to set the desired microwave power. And press the CONV. (ºC) button to set the cooking temperature. When the INSTANT COOK/START button is touched, the following operations occur:

1. The numbers on the digital readout start the count down to zero.
2. The oven lamp, cooling fan motor, turntable motor and convection motor are energized.
3. The relay RY3 will be energized and the main supply voltage is applied to the top grill heating element.
4. The relay RY4 is energized (if the cavity temperature is lower than selected temperature) and the main supply voltage is applied to the bottom heating element.
5. The relay RY2 is energized and the microwave energy is generated by magnetron.
6. Now, the food is cooked by microwave and convection energy simultaneously

2. MICROWAVE AND TOP GRILL (Figure O-5b)

Press MIX button 2 times. And enter the desired cooking time by rotating the ENCODER dial. And press MICRO POWER button to set the desired microwave power. When the INSTANT COOK/START button is touched, the following operations occur:

1. The numbers on the digital readout start the count down to zero.
2. The oven lamp, cooling fan motor and turntable motor are energized.
3. The relay RY3 is energized and the main supply voltage is applied to the top grill heating element.
4. The relay RY2 is energized and the microwave energy is generated by magnetron.
5. Now, the food is cooked by microwave and top grill simultaneously.

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3. MICROWAVE AND BOTTOM GRILL (Figure O-5c)

Press MIX button 3 times. And enter the desired cooking time by rotating the ENCODER dial. And press MICRO POWER button to set the desired microwave power. When the INSTANT COOK/START button is touched, the following operations occur:

1. The numbers on the digital readout start the count down to zero.
2. The oven lamp, cooling fan motor and turntable motor are energized.
3. The relay RY4 is energized and the main supply voltage is applied to the bottom grill heating element.
4. The relay RY2 is energized and the microwave energy is generated by magnetron.
5. Now, the food is cooked by microwave and bottom grill simultaneously.

[6] ON/OFF TIME RATIO

In grill cooking, convection cooking or combi cooking, the top heater, bottom heater or magnetron operate within a 54 second time base. The following table is the ON / OFF time ratio at each power output of the top heaters, bottom heater or magnetron.

POWER OUTPUT	ON TIME	OFF TIME
100%	54 sec.	0 sec.
90%	49 sec.	5 sec.
80%	45 sec.	9 sec.
70%	40 sec.	14 sec.
60%	36 sec.	18 sec.
50%	29 sec.	25 sec.
40%	24 sec.	30 sec.
30%	18 sec.	36 sec.
20%	13 sec.	41 sec.
10%	9 sec.	45 sec.

[7] AUTO POWER CONTROL OPERATION

The magnetron, top or bottom heating elements, the fan motor or the convection motor will operate in accordance with following specification.

1. OUTPUT POWER CONTROL (MANUAL COOK)

OPERATION MODE	DEVICE	POWER CONTROL
MICROWAVE (100%) SINGLE OPERATION	Microwave	100% 20min, then 70%
TOP GRILL (100%) SINGLE OPERATION	Top heater	100% 15min, then 50%
BOTTOM GRILL (100%) SINGLE OPERATION	Bottom heater	100% 15min, then 50%
TOP(100%)/BOTTOM(100%) COMBI OPERATION	Top heater Bottom heater	100% 6min then 70% and 70% 9min then 50% 100% 6min then 70% and 70% 9min then 50%
MICRO(100%)/TOP GRILL(100%) COMBI OPERATION	Microwave Top heater	100% 20min, then 70% 100% 15min, then 50%
MICRO(70 - 10%)/TOP GRILL(100%) COMBI OPERATION	Microwave Top heater	- 100% 15min, then 50%
MICRO(100%)/BOTTOM GRILL(100%) COMBI OPERATION	Microwave Bottom heater	100% 20min, then 70% 100% 15min, then 50%
MICRO(70 - 10%)/BOTTOM GRILL(100%) COMBI OPERATION	Microwave Bottom heater	- 100% 15min, then 50%
Repeat Cook	Microwave Top heater Bottom heater	In case same cooking mode is repeated within 1min 15sec (including stop, end), oven calculates total cooking time and reduce the power level.

2. OUTPUT POWER CONTROL (AUTO COOK)

OPERATION MODE	DEVICE	POWER CONTROL
Repeat Auto Cook	Microwave	The power level is not reduced 1 time cooking. But only in case same menu is repeated within 1min 15sec, the power level of micro and grill is reduced from 100% to 70% in 20mins after starting of last cooking. (Even if the time of the last cooking is longer than 20mins, the power level isn't reduced on the last cooking, and it is reduced from the beginning of the next cooking.) However, in time calculated from the start of the 1st cooking, even if the Cook mode changed, when repetition cooking of the menu with which 100% of top & bottom heaters continues are performed, as shown in the following table, the power down of the cooking of the 2nd henceforth is carried out. (The 1st cooking is not applied)

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3. COOLING FAN OPERATION

OPERATION MODE	DEVICE	POWER CONTROL
PREHEAT	Cooling	60%
CONV. (OVEN)	Cooling fan	60% 60 min. then 100%
Others	Cooling fan	100%
After cooking	Cooling fan	A cooling fan continues the rotation when Oven temperature is more than 120°C. Then, it stops when it is less than 105°C
	Indication	NOW COOLING is indicated during the cooling fan movement after operation is finished. (It isn't indicated during a fan movement to stop on the way.)

4. CONVECTION POWER SETTING

4.1. PREHEATING

TEMP		250°C, 230°C, 220°C, 200°C, 180°C, 160°C, 130°C, 100°C, 70°C, 40°C
HEATING ELEMENT	TOP	100%
	BOTTOM	100%
COOLING FAN		60%
CONV. FAN		0%

4.2. CONVECTION

TEMP			250°C	230°C	220°C	200°C	180°C	160°C	130°C	100°C	70°C	40°C
☆WITHOUT PREHEATING	HEATING ELEMENT	TOP	50%	40%	40%	30%	20%	10%	10%	10%	10%	10%
		BOTTOM	100%	90%	80%	70%	70%	60%	50%	40%	30%	20%
☆WITH PREHEATING	HEATING ELEMENT	TOP	50%	40%	40%	30%	20%	10%	10%	10%	10%	10%
		BOTTOM	90%	70%	60%	50%	50%	50%	50%	40%	30%	20%
COOLING FAN			60% 60min, then 100%									
CONV. FAN			100%									0%

4.3. COMBI-1 (Micro + Conv)

TEMP			250°C	230°C	220°C	200°C	180°C	160°C	130°C	100°C	70°C	40°C
☆WITHOUT PREHEATING	HEATING ELEMENT	TOP	50%	40%	40%	30%	20%	10%	10%	10%	10%	10%
		BOTTOM	100%	90%	80%	70%	70%	60%	50%	40%	30%	20%
☆WITH PREHEATING	HEATING ELEMENT	TOP	50%	40%	40%	30%	20%	10%	10%	10%	10%	10%
		BOTTOM	90%	70%	60%	50%	50%	50%	50%	40%	30%	20%
MICRO			10%, 30%, 50%									
COOLING FAN			100%									
CONV. FAN			100%									0%

NOTE: ☆The oven temp was checked by the thermometer when each stage is started.
If the oven temp is same or higher than 105°C, the oven was judged as "with preheating".
When the oven temp is lower than 105°C or the cooling fan stops, the oven was judged as "without preheating".
Micro and Top heating element can't be on at the same time.

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CHAPTER 6. FUNCTION OF IMPORTANT COMPONENTS

[1] DOOR OPEN MECHANISM

The door can be opened by pulling the door handle. When the handle is pulled, the latch head is pulled, the latch head is moved upward, and released from the latch hook now the door can be opened.

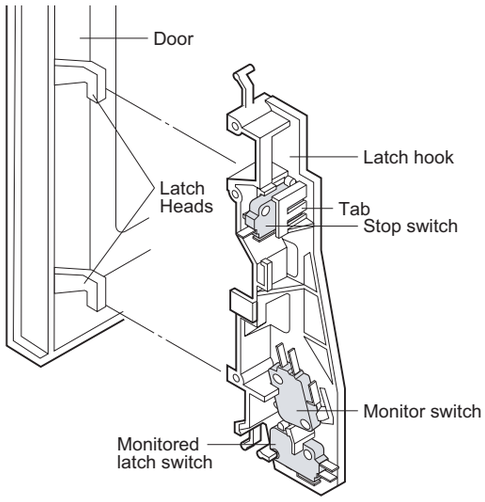


Figure D-1. Door Open Mechanism

[2] SWITCH

1. MONITORED LATCH SWITCH

1. When the oven door is closed, the contacts (COM-NO) of the switch must be closed. And the contacts (COM-NC) must be opened.
2. When the oven door is opened, the contacts (COM-NO) of the switch must be opened. And the contacts (COM-NC) must be closed.

2. STOP SWITCH

1. When the oven door is closed, the contacts (COM-NO) of the switch must be closed.
2. When the oven door is opened, the contacts (COM-NO) of switch must be opened.

3. MONITOR SWITCH

The monitor switch is activated (the contacts opened) by the upper latch head on the door while the door is closed. The switch is intended to render the oven inoperative by means of blowing the fuse F8A when the contacts of the monitored latch switch fail to open when the door is opened.

Function

1. When the door is opened, the contacts (COM-NC) of monitor switch close (to the ON condition) due to their being normally closed and contacts (COM-NO) open. At this time the contacts (COM-NO) of monitored latch switch is in the OFF condition (contacts open) due to their being normally open contact switches.
2. As the door goes to a closed position, the monitor switch contacts (COM-NC) are opened and contacts (COM-NO) closed and then contacts (COM-NO) of monitored latch switch and stop switch are closed.(On opening the door, each of these switches operate inversely.)
3. If the door is opened and the monitored latch switch contacts (COM-NO) fail to open, the fuse F8A blows immediately after closing of the monitor switch (COM-NC) contacts.

CAUTION: BEFORE REPLACING A BLOWN FUSE F8A, TEST THE MONITORED LATCH SWITCH AND MONITOR SWITCH FOR PROPER OPERATION. (REFER TO CHAPTER “TEST PROCEDURE”).

[3] FUSE

1. FUSE 20A 250V

If the wire harness or electrical components are shortcircuited, this fuse blows to prevent an electric shock or fire hazard.

2. FUSE F8A 250V

1. If the wire harness or electrical components are shortcircuited, this fuse blows to prevent an electric shock or fire hazard.
2. The fuse also blows when the monitored latch switch remains closed with the oven door open and when the monitor switch contact (COM-NC) closes.
3. The fuse also blows when the asymmetric rectifier, H.V. rectifier, H.V. wire harness, H.V. capacitor, magnetron or secondary winding of high voltage transformer is shorted.

[4] TC TRANSFORMER

T/C transformer converts A.C. line voltage into low voltage to drive the control unit.

[5] THERMAL CUT-OUT

1. THERMAL CUT-OUT 125°C (MG)

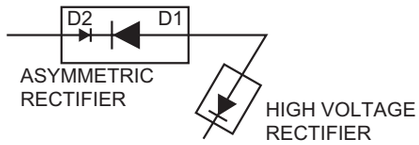
This thermal cut-out protects the magnetron against overheat. If the temperature goes up higher than 125°C because the fan motor is interrupted or the ventilation openings are blocked, the thermal cut-out will open and line voltage to the high voltage transformer will cut off and operation of the magnetron will be stopped. The defective thermal cut-out must be replaced with a new one.

2. THERMAL CUT-OUT 145°C (OVEN)

This thermal cut-out protects against overheating /fire inside the oven. The cut-out contacts will open when temperatures exceed 145°C. When the cut-out cools itself down to the operating temperature of 115°C, the contacts of the thermal cut-out will close again.

[6] ASYMMETRIC RECTIFIER

The asymmetric rectifier is solid state device that prevents current flow is both directions. And it prevents the temperature rise of the high voltage transformer by blowing the fuse F8A when the high voltage rectifier is shorted.
The rated peak reverse voltage of D1 of the asymmetric rectifier is 6 KV. The rated peak reverse voltage of D2 of the asymmetric rectifier is 1.7 KV. D1 and D2 of the asymmetric rectifier or high voltage rectifier are shorted when the each peak reverse voltage goes beyond the each rated peak reverse voltage. (The process of the blowing the fuse F8A.)



1. The high voltage rectifier is shorted by some fault when microwave cooking or combi cooking.

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2. The peak reverse voltage of D2 of the rectifier goes beyond the rated peak reverse voltage 1.7 KV in the voltage doubler circuit.
3. D2 of the rectifier is shorted.
4. The large electric currents flow through the high voltage winding of the high voltage transformer.
5. The large electric currents beyond 8A flow through the primary winding of the high voltage transformer.
6. The fuse F2 F8A blows by the large electric currents.
7. The power supplying to the high voltage transformer is cut off.

[7] NOISE FILTER

The noise filter assembly prevents radio frequency interference that might flow back in the power circuit.

[8] MOTOR

1. TURNTABLE MOTOR

The turntable motor rotates the turntable.

2. FAN MOTOR

The fan motor drives a blade which draws external cool air. This cool air is directed through the air vanes surrounding the magnetron and cools the magnetron. This air is channelled through the oven cavity to remove steam and vapours given off from heating food. It is then exhausted through the exhausting air vents of the oven cavity.

3. CONVECTION MOTOR

The convection motor drives the convection fan and provide the heated air.

[9] HEATING ELEMENT

1. TOP GRILL HEATING ELEMENT

The grill heating element is provided to brown the food and is located on the top of the oven cavity.

2. BOTTOM GRILL HEATING ELEMENT

The grill heating element is provided to brown the food and is located at the base of the oven cavity.

[10] CONVECTION COOKING SYSTEM

This oven is designed with a hot air heating system where food is heated by forced circulation of the hot air produced by the grill heating elements.

The air heated by the grill heating elements is circulated through the convection passage provided on the outer casing of the oven cavity by means of the convection fan which is driven by the convection motor. It is then enters the inside of the oven through the vent holes provided on the back side of the oven. Next, the hot air heats the food on the turntable and leaves the oven cavity through the vent in the oven cavity rear wall.

In this way, the hot air circulates inside the oven cavity to raise its temperature and, at the same time, comes into contact with the food being cooked. When the temperature inside the oven cavity reaches the selected temperature, the heating elements are de-energized. When the temperature inside the oven cavity drops below the selected temperature, the heating elements are energized again. In this way, the inside of the oven cavity is maintained at approximately the selected temperature.

When the convection time reaches “0”, the heating elements are de-energized and the convection fan stops operating and the oven shuts off. At that time if the cavity air temperature has risen above 120°C, the fan motor remains rotating. Automatically the fan motor will be shut down at low temperature (less than 105°C).

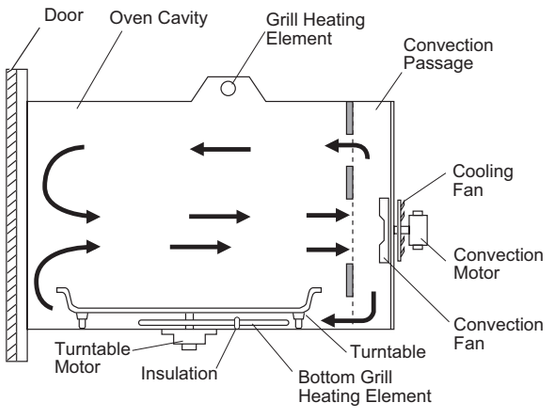


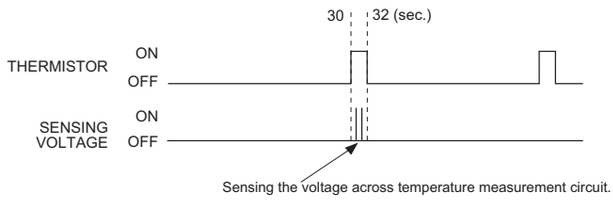
Figure D-2. Convection Cooking System

[11] FIRE SENSING FEATURE

The oven will stop its operation when there is a fire in the oven cavity in microwave cooking condition.

LSI measures the voltage across the temperature measurement circuit intermittently within 32-seconds time base since the oven is started in microwave cooking condition. The oven will stop its operation when the difference of the voltage is more than 0.781 volts in microwave cooking condition.

1. Within a 32-seconds base, the thermistor is energized for 2 seconds. At that time, the voltage across the temperature measurement circuit is measured.
2. The oven carries out the procedure above again. If the second voltage is 0.781V higher than first voltage, LSI judges it as a fire in the oven cavity and stop the oven.
3. When LSI judges it as a fire in the oven cavity, LSI will switch off the relays to high voltage transformer and fan motor and LSI stops countering down.



[12] OPEN JUDGE BY THERMISTOR

1. If the temperature of the thermistor does not rise to more than 40°C after 4 minutes and 15 seconds from when the oven is started in convection, grill (top and bottom grills) or combi cooking mode, the oven is turned off.
2. When the thermistor or the wire harness to the thermistor is opened, the oven is turned off after 4 minutes and 15 seconds because this condition is same as above.

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CHAPTER 7. TROUBLESHOOTING GUIDE

When troubleshooting the microwave oven, it is helpful to follow the Sequence of Operation in performing the checks. Many of the possible causes of trouble will require that a specific test be performed. These tests are given a procedure letter which will be found in the “Test Procedure” section.

IMPORTANT:

If the oven becomes inoperative because of a blown fuse F8A in the monitored latch switch - monitor switch circuit, check the monitored latch switch and monitor switch before replacing the noise filter (fuse F8A).

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| TEST PROCEDURE | | |

CHAPTER 8. TEST PROCEDURES

[1] A: MAGNETRON TEST

NEVER TOUCH ANY PART IN THE CIRCUIT WITH YOUR HAND OR AN INSULATED TOOL WHILE THE OVEN IS IN OPERATION.

CARRY OUT 3D CHECKS.

Isolate the magnetron from high voltage circuit by removing all leads connected to filament terminal.

To test for an open circuit filament use an ohmmeter to make a continuity test between the magnetron filament terminals, the meter should show a reading of less than 1 ohm.

To test for short filament to anode condition, connect ohmmeter between one of the filament terminals and the case of the magnetron (ground). This test should be indicated an infinite resistance. If a low or zero resistance reading is obtained then the magnetron should be replaced.

1. MICROWAVE OUTPUT POWER

The power output of this oven is rated using the method specified by IEC 60705. Full details of how to curry out this procedure can be found in the Sharp Technical Training notes which is available from Sharp Parts Centre (part number SERV-LITMW01).

The IEC60705 procedure must be carried out using laboratory-type procedures and equipment.

These requirements make the procedure unsuitable for routine performance checks.

NOTE: **The following test method gives an indication of the output power only, it cannot be used to establish the actual/rated output power. If the true output power is required, then the IEC60705 test method must be used.**

Alternative simplified method:

1. Place 2 litres of cold water (between 12°C and 20°C) in a suitable container.
2. Stir the water and measure the temperature in °C. Note temperature as T1.
3. Place the container in the microwave and heat the water for 1 minute and 36 seconds on full power.

NOTE: **The operation time of the microwave oven includes "3" sec. (3 sec. is magnetron filament heat-up time.)**

4. When the 1 minute and 36 seconds is completed, remove the container and stir the water. Note the water temperature as T2.
5. Calculate the output power using the following formula:

   R.F. Power Output = (T2 - T1) x 90.

NOTE: The result from this test should be within the allowance of 2000cc alternative method. (±10%).

2. MICROWAVE LEAKAGE TEST

This oven should be tested for microwave leakage on completion of any repair or adjustment, following the procedure described in the Sharp Technical Training notes (part number SERV-LITMW01). The maximum leakage permitted in BS EN 60335-2-25 is 50W/m^2 (equivalent to 5W/m^2), however it is not normal to detect any significant leakage, therefore, any leakage which is detected should be investigated.

It is essential that only leakage detectors with current calibration traceable to National Physical Laboratories are used.
Suitable leakage detectors: CELTEC A100
APOLLO X1

[2] B: HIGH VOLTAGE TRANSFORMER TEST

WARNING: **High voltages and large currents are present at the secondary winding and filament winding of the power transformer. It is very dangerous to work near this part when the oven is on. NEVER make any voltage measurements of the high-voltage circuits, including the magnetron filament.**

1. CARRY OUT 3D CHECKS.
2. Disconnect the leads to the primary winding of the high voltage transformer. Disconnect the filament and secondary winding connections from the rest of the HV circuitry. Using an ohmmeter, set on a low range, it is possible to check the continuity of all three winding. The following readings should be obtained:

   a.Primary winding ---------- approximately 2.1 Ω

   b.Secondary winding ---------- approximately 133 Ω

   c.Filament winding ---------- less than 1 Ω

If the readings obtained are not stated as above, then the high voltage transformer is probably faulty and should be replaced.

3. Also, the high voltage transformer has the thermal cut-out in the primary coil. The thermal cut-out will open when the temperature of the thermal cut-out in the primary coil reaches approximately 150°C. The thermal cut-out resets automatically at 130°C. If an ohmmeter indicates an open circuit under normal condition, replace the high voltage transformer because the primary coil (thermal cut-out) has opened. An open primary coil (thermal cut-out) indicates overheating of the high voltage transformer. Check for restricted air flow to the high voltage transformer, especially the ventilation opening.
4. CARRY OUT 4R CHECKS.

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[3] C: HIGH VOLTAGE RECTIFIER TEST

CARRY OUT 3D CHECKS.

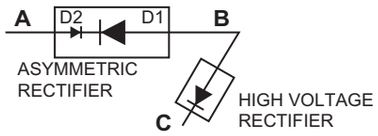
Isolate the high voltage rectifier assembly from the HV circuit. The high voltage rectifier can be tested using an ohmmeter set to its highest range.

Connect the ohmmeter across the terminal B+C of the high voltage rectifier and note the reading obtained. Reverse the meter leads and note this second reading. The normal resistance is infinite in one direction and more than 100 kΩ in the other direction.

CARRY OUT 4R CHECKS.

ASYMMETRIC RECTIFIER TEST

CARRY OUT 3D CHECKS.



Isolate the high voltage rectifier assembly from the HV circuit. The asymmetric rectifier can be tested using an ohmmeter set to its highest range across the terminals A+B of the asymmetric rectifier and note the reading obtained. Reverse the meter leads and note this second reading. If an open circuit is indicated in both directions then the asymmetric rectifier is good. If the asymmetric rectifier is shorted in either direction, then the asymmetric rectifier is faulty and must be replaced with high voltage rectifier. When the asymmetric rectifier is defective, check whether magnetron, high voltage rectifier, high voltage wire or filament winding of the high voltage transformer is shorted.

CARRY OUT 4R CHECKS.

NOTE: FOR MEASUREMENT OF THE RESISTANCE OF THE RECTIFIER, THE BATTERIES OF THE MEASURING INSTRUMENT MUST HAVE A VOLTAGE AT LEAST 6 VOLTS, BECAUSE OTHERWISE AN INFINITE RESISTANCE MIGHT BE SHOWN IN BOTH DIRECTIONS.

[4] D: HIGH VOLTAGE CAPACITOR TEST

CARRY OUT 3D CHECKS.

1. Isolate the high voltage capacitor from the circuit.
2. Continuity check must be carried out with measuring instrument which is set to the highest resistance range.
3. A normal capacitor shows continuity for a short time (kick) and then a resistance of about 10MΩ after it has been charged.
4. A short-circuited capacitor shows continuity all the time.
5. An open capacitor constantly shows a resistance about 10 MΩ because of its internal 10MΩ resistance.
6. When the internal wire is opened in the high voltage capacitor shows an infinite resistance.
7. The resistance across all the terminals and the chassis must be infinite when the capacitor is normal.

If incorrect reading are obtained, the high voltage capacitor must be replaced.

CARRY OUT 4R CHECKS.

[5] E: SWITCH TEST

CARRY OUT 3D CHECKS.

Isolate the switch to be tested and using an ohmmeter check between the terminals as described in the following table.

Table: Terminal Connection of Switch

Plunger Operation	Common terminal to Normally open terminal	Common terminal to Normally close terminal
Released	Open circuit	Short circuit
Depressed	Short circuit	Open circuit

If incorrect readings are obtained, make the necessary switch adjustment or replace the switch.

CARRY OUT 4R CHECKS.

[6] F: THERMISTOR TEST

CARRY OUT 3D CHECKS.

Disconnect the connector B from CPU unit. Measure the resistance of the thermistor with an ohmmeter. Connect the ohmmeter leads to Pin No's C1 and C3 of the thermistor harness.

Room Temperature	Resistance
20°C - 30°C	Approximately 359.9 kΩ - 152 kΩ

If the meter does not indicate above resistance, replace the thermistor.

CARRY OUT 4R CHECKS.

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[7] G: THERMAL CUT-OUT TEST

CARRY OUT 3D CHECKS.

Disconnect the leads from the terminals of the thermal cut-out. Then using an ohmmeter, make a continuity test across the two terminals as described in the below.

Table: Thermal Cut-out Test

Parts Name	Temperature of "ON" condition (closed circuit).	Temperature of "OFF" condition (open circuit).	Indication of ohmmeter (When room temperature is approx. 20°C.)
Thermal cut-out 125°C	This is not resetable type.	Above 125°C	Closed circuit
Thermal cut-out 145°C	Below 115°C.	Above 145°C	Closed circuit

If incorrect readings are obtained, replace the thermal cut-out.

An open circuit thermal cut-out (MG) indicates that the magnetron has overheated, this may be due to resistricted ventilation, cooling fan failure.

An open circuit thermal cut-out (OVEN) indicates that the oven cavity has overheated, this may be due to no load operation, or excessive heat / fire inside the oven.

CARRY OUT 4R CHECKS.

[8] H: MOTOR WINDING TEST

CARRY OUT 3D CHECKS.

Disconnect the leads from the motor. Using an ohmmeter, check the resistance between the two terminals as described in the table below.

Table: Resistance of Motor

Motors	Resistance
Fan motor	Approximately 399Ω
Turntable motor	Approximately 14.7kΩ
Convection fan motor	Approximately 288kΩ

If incorrect readings are obtained, replace the motor.

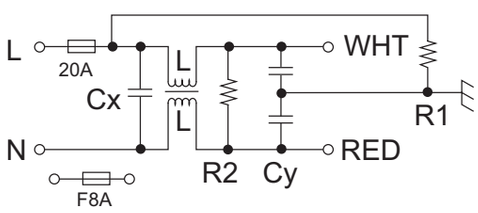
CARRY OUT 4R CHECKS.

[9] I: NOISE FILTER TEST

CARRY OUT 3D CHECKS.

Disconnect the leads from the terminals of the noise filter.
Using an ohmmeter, check between the terminals as described in the following table.

MEASURING POINT	INDICATION OF OHMMETER
Between N and L	Approximately 680kΩ
Between terminal N and WHITE	Short circuit
Between terminal L and RED	Short circuit



L (min)	Cx ± 20%	Cy ± 20%	R1	R2
1.0mH	0.22 uF	4700pF	10 MΩ	680kΩ

If incorrect readings are obtained, replace the noise filter unit.

CARRY OUT 4R CHECKS.

[10] J: BLOWN FUSE 20A

CARRY OUT 3D CHECKS.

If the fuse 20A is blown, there is a shorts or grounds in electrical parts or wire harness. Check them and replace the defective parts or repair the wire harness.

CARRY OUT 4R CHECKS.

CAUTION: **Only replace fuse with the correct value replacement.**

[11] K: BLOWN FUSE F8A

CARRY OUT 3D CHECKS.

1. If the fuse F8A is blown when the door is opened, check the monitored latch switch and monitor switch.
2. If the fuse F8A is blown by incorrect door switching replace the defective switch(es) and the noise filter (fuse F8A).
3. If the fuse F8A is blown, there could be shorts in the asymmetric rectifier or there is a ground in wire harness. A short in the asymmetric rectifier may be occurred due to short or ground in H.V. rectifier, magnetron, high voltage transformer or H.V. wire. Check them and replace the defective parts or repair the wire harness.

CARRY OUT 4R CHECKS.

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[12] L: GRILL HEATING ELEMENTS (TOP) AND BOTTOM HEATING ELEMENT TEST

CARRY OUT 3D CHECKS.

Before carrying out the following tests make sure the heating element is cool completely.

1. Resistance of heater.

   Disconnect the wire leads to the heating element to be tested. Using ohmmeter with low resistance range. Check the resistance across the terminals of the heating element as described in the following table.

Table: Resistance of heater

Parts name	Resistance
Grill heating element (Top)	Approximately 48
Bottom heating element	Approximately 92Ω

2. Insulation resistance.

   Disconnect the wire leads to the heating element to be tested. Check the insulation resistance between the element terminal and cavity using a 500V - 100MΩ insulation tester. The insulation resistance should be more than 10MΩ in the cold start.

If the results of above test 1 and/or 2 are out of above specifications, the heating element is probably faulty and should be replaced.

CARRY OUT 4R CHECKS.

[13] M: CONTROL PANEL ASSEMBLY TEST

The control panel consists of circuits including semiconductors such as LSI, ICs, etc. Therefore, unlike conventional microwave ovens, proper maintenance can not be performed with only a voltmeter and ohmmeter.

In this service manual, the control panel assembly is divided into two units, Control Unit and Jog switch Unit, and troubleshooting by replacement is described according to the symptoms indicated.

1. Jog switch Unit Note: Check Jog switch unit wire harness connection before replacement.

The following symptoms indicate a defective Jog switch unit. Replace the Jog switch unit.

1.1. Tact switch

1) When touching the buttons, a certain button produces no signal at all.
2) When touching the buttons, sometimes a button produces no signal.

1.2. Potentiometer

1) When rotating the potentiometer, the cooking mode can not be selected.

1.3. Encoder

1) When rotating the encoder, the cooking time or the weight of food can not be entered.

2. Control Panel

The following symptoms indicate a defective control unit. Before replacing the control unit, perform the Jog switch unit test (Procedure N) to determine if control unit is faulty.

2.1. In connection with buttons

1) When touching the buttons, a certain group of buttons do not produce a signal.
2) When touching the buttons, no buttons produce a signal.

2.2. In connection with indicators

1) At a certain digit, all or some segments do not light up.
2) At a certain digit, brightness is low.
3) Only one indicator does not light up.
4) The corresponding segments of all digits do not light up; or they continue to light up.
5) Wrong figure appears.
6) A certain group of indicators do not light up.
7) The figure of all digits flicker.

2.3. Other possible troubles caused by defective control unit.

1) Buzzer does not sound or continues to sound.
2) Clock does not operate properly.
3) Cooking is not possible.
4) Proper temperature measurement is not obtained.

[14] N: JOG SWITCH UNIT TEST

If the display fails to clear when the STOP button is depressed, first verify the cable is making good contact, verify that the stop switch operates properly; that is the contacts are closed when the door is closed and open when the door is open. If the stop switch is good, disconnect the cable that connects the Jog switch unit to the control unit and make sure the stop switch is closed (either close the door or short the stop switch connector). Use the Jog switch unit matrix indicated on the control panel schematic and place a jumper wire between the pins that correspond to the STOP button making momentary contact. If the control unit responds by clearing with a beep the Jog switch unit is faulty and must be replaced. If the control unit does not respond, it is a faulty and must be replaced. If a specific button does not respond, the above method may be used (after clearing the control unit) to determine if the control unit or Jog switch unit is at fault.

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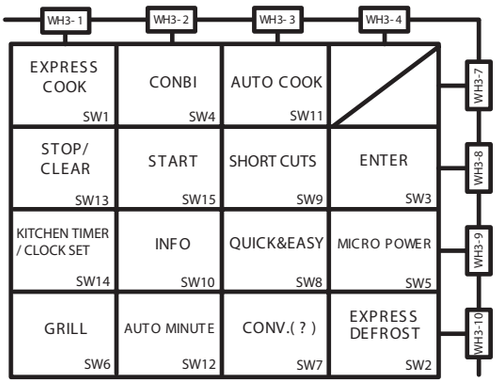
CARRY OUT 4R CHECKS.



[15] O: RELAY TEST

CARRY OUT 3D CHECKS.

Remove the outer case and check voltage between Pin Nos. 5 and 7 of the 4 pin connector (E) on the control unit with an A.C. voltmeter. The meter should indicate 230-240 volts, if not check oven circuit.

Relay Test

Check voltage at the relay coil with a D.C. voltmeter during the microwave cooking operation, grill operation, convection operation or combi operation.

DC. voltage indicated ..... Defective relay.

DC. voltage not indicated ..... Check diode which is connected to the relay coil. If diode is good, control unit is defective.

RELAY SYMBOL	OPERATIONAL VOLTAGE	CONNECTED COMPONENTS
RY1	APPROX. 18.0V D.C.	Oven lamp / Turntable motor
RY2	APPROX. 18.0V D.C.	High voltage transformer
RY3	APPROX. 24.0V D.C.	Grill (Top) heating element
RY4	APPROX. 24.0V D.C.	Bottom heating element
RY5	APPROX. 24.0V D.C.	Touch control transformer
RY6	APPROX. 24.0V D.C.	Fan motor
RY7	APPROX. 24.0V D.C.	Convection motor

CARRY OUT 4R CHECKS.

[16] P: PROCEDURES TO BE TAKEN WHEN THE FOIL PATTERN ON THE PRINTED WIRING BOARD (PWB) IS OPEN

To protect the electronic circuits, this model is provided with a fine foil pattern added to the input circuit on the PWB, this foil pattern acts as a fuse. If the foil pattern is open, follow the troubleshooting guide given below for repair.

Problem: POWER ON, indicator does not light up.

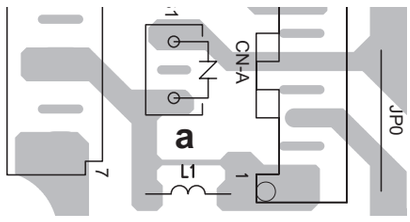
CARRY OUT 3D CHECKS.

STEPS	OCCURRENCE	CAUSE OR CORRECTION
1	The rated AC voltage is not present between Pin Nos. 5 and 7 of the 4-pin connector (E).	Check supply voltage and oven power cord.
2	The rated AC voltage is present at primary side of low voltage transformer.	Low voltage transformer or secondary circuit defective. Check and replace the touch control transformer or the control unit.
3	Pattern at “a” is broken.	Replace the control unit. (CARRY OUT 3D CHECKS BEFORE REPAIR)

NOTE: *At the time of these repairs, make a visual inspection of the varistor for burning damage and examine the transformer with tester for the presence of layer short circuit (check primary coil resistance).

If any abnormal condition is detected, replace the control unit.

CARRY OUT 4R CHECKS.



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CHAPTER 9. CONTROL PANEL ASSEMBLY

[1] OUTLINE OF CONTROL PANEL

The control section consists of the following units as shown in the control panel circuit.

(1) Jog Switch Unit

(2) Control Unit

The principal functions of these units and signals communicated among them are explained below.

1. Jog Switch Unit

The jog switch unit is composed of a matrix, signals generated in the LSI are sent to the jog switch unit from P42 – P45.

When a button is touched, a signal is completed through the jog switch unit and passed back to the LSI through P00, P20, P21 and P22 to perform the function that was requested.

2. Control Unit

Control unit consists of LSI, power source circuit, synchronizing signal circuit, reset circuit, buzzer circuit, indicator circuit, encoder circuit, potentiometer circuit, temperature measurement circuit and back light circuit.

1) LSI

   This LSI controls the temperature measurement signal, tact switch strobe signal, relay driving signal for oven function and indicator signal.

2) Power Source Circuit

   This circuit generates voltage necessary in the control unit.

Symbol	Voltage	Application
VC	-5.2V	LSI(IC1)

3) Synchronizing Signal Circuit

   The power source synchronizing signal is available in order to compose a basic standard time in the clock circuit. It accompanies a very small error because it works on commercial frequency.

4) Reset Circuit

   A circuit to generate a signal which resets the LSI to the initial state when power is supplied.

5) Buzzer Circuit

   The buzzer is responsive to signals from the LSI to emit audible sounds (tact switch touch sound and completion sound).

6) Stop Switch

   A switch to “tell” the LSI if the door is open or closed.

7) Relay Circuit

   To drive the magnetron, top and bottom heating element, convection motor, fan motor, turntable motor, touch control transformer and light the oven lamp.

8) Encoder

   The encoder converts the signal generated by LSI into the pulse signal, and the pulse signal is returned to the LSI.

9) Potentiometer Circuit

   The circuit makes setting of the cooking mode by variable resistance.

10) Back Light Circuit

    A circuit to drive the back light (Light emitting diodes LD1 - LD10).

11) Indicator Circuit

    This circuit consists 7-digits, 27-segments and 4-common electrodes using a Liquid Crystal Display.

12) Temperature Measurement Circuit: (OVEN THERMISTOR)

    The temperature in the oven cavity is sensed by the thermistor. The variation of resistance according to sensed temperature is detected by the temperature measurement circuit and the result applied to LSI. The LSI uses this information to control the relay and display units.

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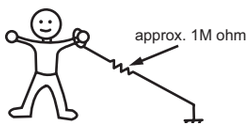
[2] SERVICING FOR CONTROL PANEL

1. Precautions for Handling Electronic Components

This unit uses CMOS LSI in the integral part of the circuits. When handling these parts, the following precautions should be strictly followed. CMOS LSI have extremely high impedance at its input and output terminals. For this reason, it is easily influenced by the surrounding high voltage power source, static electricity charge in clothes, etc., and sometimes it is not fully protected by the built-in protection circuit.

In order to protect CMOS LSI.

1) When storing and transporting, thoroughly wrap them in aluminium foil. Also wrap PW boards containing them in aluminium foil.
2) When soldering, ground the technician as shown in the figure and use grounded soldering iron and work table.



2. Servicing of Control Panel

We describe the procedures to permit servicing of the control panel of the microwave oven and the precautions you must take when doing so. To perform the servicing, power to the control panel is available either from the power line of the oven or from an external power source.

1) Servicing the control panel with power supply of the oven:

CAUTION: THE HIGH VOLTAGE TRANSFORMER OF THE MICROWAVE OVEN IS STILL LIVE DURING SERVICING AND PRESENTS A HAZARD.

Therefore, before checking the performance of the control panel,

(1) Disconnect the power supply cord, and then remove outer case.
(2) Open the door and block it open.
(3) Discharge high voltage capacitor.
(4) Disconnect the leads to the primary of the power transformer.
(5) Ensure that these leads remain isolated from other components and oven chassis by using insulation tape.
(6) After that procedure, re-connect the power supply cord.

After checking the performance of the control panel,

(1) Disconnect the power supply cord.
(2) Open the door and block it open.
(3) Reconnect the leads to the primary of the power transformer.
(4) Reinstall the outer case (cabinet).
(5) Reconnect the power supply cord after the outer case is installed.
(6) Run the oven and check all functions.

a) On some models, the power supply cord between the control panel and the oven is so short that the two can't be separated.

For those models, check and repair all the controls (sensorrelated ones included) of the control panel while keeping it connected to the oven.

b) On some models, the power supply cord between the control panel and the oven is long enough that they may be separated from each other. For those models, therefore, it is possible to check and repair the controls of the control panel while keeping it apart from the oven; in this case you must short both ends of the door sensing switch (on PWB) of the control panel with a jumper, which brings about an operational state that is equivalent to the oven door being closed. As for the sensor related controls of the control panel, checking them is possible if the dummy resistor(s) with resistance equal to that of the controls are used.

2) Servicing the control panel with power supply from an external power source:

Disconnect the control panel completely from the oven, and short both ends of the door sensing switch (on PWB) of the control panel, which brings about an operational state that is equivalent to the oven door being closed. Connect an external power source to the power input terminal of the control panel, then it is possible to check and repair the controls of the control panel; it is also possible to check the sensor-related controls of the control panel by using the dummy resistor(s).

3. Servicing Tools

Tools required to service the control panel assembly.

1) Soldering iron: 60W

(It is recommended to use a soldering iron with a grounding terminal.)

2) Oscilloscope: Single beam, frequency range: DC - 10MHz type or more advanced model.
3) Others: Hand tools

4. Other Precautions

1) Before turning on the power source of the control unit, remove the aluminium foil applied for preventing static electricity.
2) Connect the connector of the switch unit to the control unit being sure that the lead wires are not twisted.
3) After aluminium foil is removed, be careful that abnormal voltage due to static electricity etc. is not applied to the input or output terminals.
4) Attach connectors, electrolytic capacitors, etc. to PWB, making sure that all connections are tight.
5) Be sure to use specified components where high precision is required.

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CHAPTER 10. PRECAUTIONS FOR USING LEAD-FREE SOLDER

1. Employing lead-free solder

The “Main PWB” of this model employs lead-free solder. This is indicated by the “LF” symbol printed on the PWB and in the service manual. The suffix letter indicates the alloy type of the solder.

Example:

Indicates lead-free solder of tin, silver and copper

2. Using lead-free wire solder

When repairing a PWB with the “LF” symbol, only lead-free solder should be used. (Using normal tin/lead alloy solder may result in cold soldered joints and damage to printed patterns.)

As the melting point of lead-free solder is approximately 40°C higher than tin/lead alloy solder, it is recommend that a dedicated bit is used, and that the iron temperature is adjusted accordingly.

3. Soldering

As the melting point of lead-free solder (Sn-Ag-Cu) is higher and has poorer wettability, (flow), to prevent damage to the land of the PWB, extreme care should be taken not to leave the bit in contact with the PWB for an extended period of time. Remove the bit as soon as a good flow is achieved.
The high content of tin in lead free solder will cause premature corrosion of the bit. To reduce wear on the bit, reduce the temperature or turn off the iron when it is not required.

Leaving different types of solder on the bit will cause contamination of the different alloys, which will alter their characteristics, making good soldering more difficult. It will be necessary to clean and replace bits more often when using lead-free solder. To reduce bit wear, care should be taken to clean the bit thoroughly after each use.

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CHAPTER 11. COMPONENT REPLACEMENT AND ADJUSTMENT PROCEDURE

[1] BEFORE OPERATING

WARNING AGAINST HIGH VOLTAGE:

Microwave ovens contain circuitry capable of producing very high voltage and current, contact with following parts may result in severe, possibly fatal, electric shock.

(Example)

High Voltage Capacitor, High Voltage Transformer, Magnetron, High Voltage Rectifier Assembly, High Voltage Harness etc..

WARNING: **Avoid possible exposure to microwave energy. Please follow the instructions below before operating the oven.**

1. Disconnect the power supply cord.
2. Visually check the door and cavity face plate for damage (dents, cracks, signs of arcing etc.).

Carry out any remedial work that is necessary before operating the oven.

Do not operate the oven if any of the following conditions exist;

1. Door does not close firmly.
2. Door hinge, support or latch hook is damaged.
3. The door gasket or seal is damaged.
4. The door is bent or warped.
5. There are defective parts in the door interlock system.
6. There are defective parts in the microwave generating and transmission assembly.
7. There is visible damage to the oven.

Do not operate the oven:

1. Without the RF gasket (Magnetron).
2. If the wave guide or oven cavity are not intact.
3. If the door is not closed.
4. If the outer case (cabinet) is not fitted.

WARNING FOR WIRING

To prevent an electric shock, take the following manners.

1. Before wiring,
   1) Disconnect the power supply cord.
   2) Open the door and block it open.
   3) Discharge the high voltage capacitor and wait for 60 seconds.
2. Don't let the wire leads touch to the following parts;
   1) High voltage parts:
      Magnetron, High voltage transformer, High voltage capacitor and High voltage rectifier assembly.
   2) Hot parts:
      Grill heating element, Oven lamp, Magnetron, High voltage transformer and Oven cavity.
   3) Sharp edge:
      Bottom plate, Oven cavity, Waveguide flange, Chassis support and other metallic plate.
   4) Movable parts (to prevent a fault)
      Fan blade, Fan motor, Switch, Turntable motor, Convection motor.
3. Do not catch the wire leads in the outer case cabinet.
4. Insert the positive lock connector certainly until its pin is locked and make sure that the wire leads do not come off even if the wire leads are pulled.
5. To prevent an error function, connect the wire leads correctly, referring to the Pictorial Diagram.

Please refer to 'OVEN PARTS, CABINET PARTS, CONTROL PANEL PARTS, DOOR PARTS', when carrying out any of the following removal procedures:

[2] OUTER CASE CABINET REMOVAL

To remove the outer case cabinet, proceed as follows.

1. Disconnect oven from power supply.
2. Open the oven door and wedge it open.
3. Remove the two (2) screws holding the back plate to the oven cavity rear plate. Remove the back plate.
4. Remove the air duct assembly from the oven cavity rear plate.
5. Remove the air duct assembly.
6. Remove the nine (9) screws from rear and along the side edge of outer case cabinet.
7. Slide the entire case back about 3 cm to free it from retaining clips on the cavity face plate.
8. Lift the entire outer case cabinet from the oven.
9. Discharge the H.V. capacitor before carrying out any further work.
10. Do not operate the oven with the outer case cabinet removed.

NOTE: Step 1, 2 and 9 form the basis of the 3D checks.

CAUTION: DISCHARGE HIGH VOLTAGE CAPACITOR BEFORE TOUCHING ANY OVEN COMPONENT OR WIRING.

CAUTION: WHEN THE OUTER CASE CABINET IS REINSTALLED, INSTALL IT BEFORE THE BACK PLATE IS INSTALLED, OR THE OUTER CASE CABINET WILL BE DEFORMED.

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[3] HIGH VOLTAGE COMPONENTS REMOVAL
(HIGH VOLTAGE CAPACITOR AND HIGH VOLTAGE RECTIFIER ASSEMBLY)

To remove the components, proceed as follows.

1. CARRY OUT 3D CHECKS.
2. Disconnect the filament lead of the high voltage transformer and the high voltage wire A from the high voltage capacitor.
3. Remove one (1) screw holding earth side terminal of the high voltage rectifier assembly.
4. Remove one (1) screw holding fan duct to the oven cavity rear plate.
5. Remove one (1) screw holding capacitor holder to the oven cavity rear plate.
6. Release the capacitor holder from the fan duct.
7. Remove the high voltage capacitor from the capacitor holder.
8. Disconnect the high voltage rectifier assembly from the high voltage capacitor.
9. Disconnect the high voltage rectifier assembly from the high voltage capacitor.
10. Now, the high voltage rectifier assembly and the high voltage capacitor should be free.

CAUTION: WHEN REPLACING HIGH VOLTAGE RECTIFIER ASSEMBLY, ENSURE THAT THE CATHODE (EARTH) CONNECTION IS SECURELY FIXED TO THE CAPACITOR HOLDER WITH AN EARTHING SCREW.

[4] HIGH VOLTAGE TRANSFORMER REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the filament leads of high voltage transformer from high voltage capacitor and the magnetron.
3. Disconnect the high voltage transformer secondary wire from the high voltage transformer.
4. Disconnect the main wire harness from the high voltage transformer.
5. Remove the two (2) screws holding the transformer to the base plate.
6. Remove the transformer.
7. Now the high voltage transformer is free.

[5] MAGNETRON REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the H.V. wire and filament lead of the transformer from the magnetron.
3. Remove the one (1) screw holding the chassis support to the magnetron.
4. Move the air intake duct to left.
5. Carefully remove four (4) screws holding the magnetron to the waveguide. When removing the screws hold the magnetron to prevent it from falling.
6. Remove the magnetron from the waveguide with care so the magnetron antenna is not hit by any metal object around the antenna.

CAUTION: WHEN REPLACING THE MAGNETRON, BE SURE THE R.F. GASKET IS IN PLACE AND THE MAGNETRON MOUNTING SCREWS ARE TIGHTENED SECURELY.

[6] FAN MOTOR REPLACEMENT

1. REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the one (1) screw holding the noise filter to the chassis support.
3. Release the noise filter from the tabs of the fan duct.
4. Remove the one (1) screw holding the chassis support to the oven cavity front flange.
5. Remove one (1) screw holding the chassis support to the magnetron.
6. Remove the chassis support from the oven cavity.
7. Disconnect the wire leads from the fan duct.
8. Remove the one (1) screw holding the capacitor holder to the oven cavity back plate.
9. Release the tabs of the capacitor holder from the fan duct.
10. Remove the one (1) screw holding the fan duct to the oven cavity back plate.
11. Remove the fan duct from the oven.
12. Remove the fan duct from the fan motor shaft according to the following procedure.
    i) Hold the edge of the rotor of the fan motor by using a pair of groove joint pliers.

CAUTION:
- Make sure that no swarf from the rotor enters the gap between the rotor & stator of the fan motor.
- Avoid touch the coil of the fan motor with the pliers as the coil may become cut or damaged.
- Avoid deforming the bracket whilst using the pliers.

    ii) Remove the fan blade assembly from the shaft of the fan motor by pulling and rotating the fan blade with your hand.
    iii) Now, the fan blade is free.

CAUTION: Do not reuse the removed fan blade as the fixing hole may be oversize.

13. Remove the two (2) screws holding the fan motor to the fan duct.
14. Now, the fan motor is free.

2. INSTALLATION

1. Install the fan motor to the fan duct with the two (2) screws.
2. Install the fan blade to the fan motor shaft according to the following procedure.
    i) Hold the centre of the bracket which supports the shaft of the fan motor on a flat table.
    ii) Apply the screw lock tight into the hole (for shaft) of the fan blade.
    ii) Install the fan blade to the shaft of fan motor by pushing the fan blade with a small, light weight, ball peen hammer or rubber mallet.

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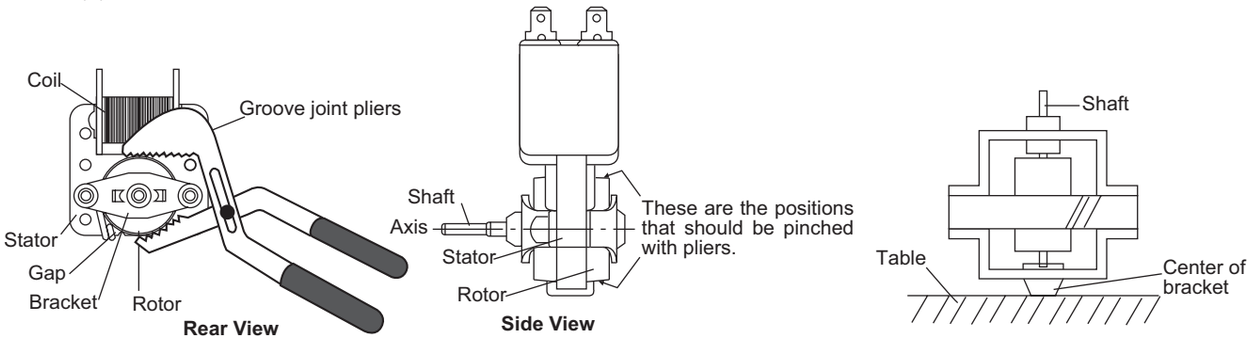
CAUTION:
- Do not hit the fan blade when installing because the bracket may be deformed.
- Make sure that the fan blade rotates smoothly after installation.
- Make sure that the axis of the shaft is not slanted.

3. Insert the tabs of the capacitor holder to the fan duct.
4. Install the fan duct to the oven cavity back plate with the one (1) screw.
5. Install the capacitor holder to the oven cavity back plate with the one (1) screw.
6. Reinstall the chassis support to the oven cavity with the one (1) screw.
7. Refit the one(1) screw to secure the chassis support to the magnetron.
8. Install the noise filter to the fan duct and the chassis support with the one (1) screw.
9. Reconnect the wire leads to the fan motor.



[7] TURNTABLE MOTOR REPLACEMENT

1. REMOVAL

1. Disconnect the oven from the power supply.
2. Remove the turntable from the oven cavity.
3. Turn the oven over.
4. Cut the four (4) bridges holding the turntable motor cover to the base plate with cutting pliers as shown in Figure C-1(a).

CAUTION: DO NOT DROP THE TURNTABLE MOTOR COVER INTO THE OVEN AFTER CUTTING THE BRIDGES. BECAUSE IT WILL DAMAGE THE WIRE LEADS OF THE MOTOR AND IT IS DIFFICULT TO REMOVE IT OUT OF THE OVEN.

5. Remove the turntable motor cover from the base plate.
6. Disconnect the wire leads from the turntable motor.
7. Remove the one (1) screw holding the turntable motor to the turntable motor angle.
8. Bend the turntable motor retaining tab back to release the motor.
9. Remove the turntable motor from the turntable motor angle.
10. Now, the turntable motor is free.

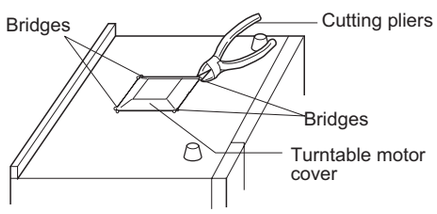


Figure C-1(a) Turntable Motor Cover Removal

2. REINSTALLATION

1. Remove the any sharp edges on the turntable motor cover and the base plate with the cutting pliers.
2. Reinstall turntable motor by locating shaft onto turntable motor shaft to the turntable motor angle with the one (1) screw.
3. Bend the turntable motor retaining tab forward to secure the motor.
4. Reconnect the wire leads to the turntable motor.
5. Insert the two (2) tabs of the turntable motor cover into the slits of the base plate as shown in Figure C-1(b).
6. Reinstall the turntable motor cover to the base plate with the screw (XHTS740P08RV0) as shown in Figure C-1(b).

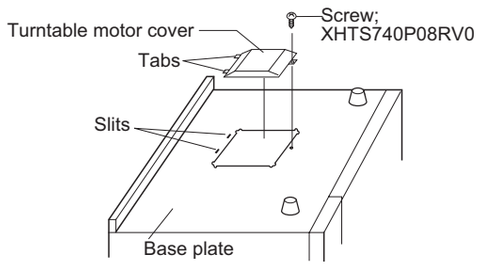


Figure C-1(b) Turntable Motor Cover Reinstallation

[8] CONVECTION FAN MOTOR REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the two (2) screws holding the back plate to oven cavity.
3. Disconnect the wire leads from the convection motor.
4. Remove the two (2) screws holding the rear heat cover to the oven cavity from out-side.
5. Remove the four (4) screws holding the convection fan duct to the oven cavity.
6. Now, the convection fan duct assembly is free.
7. Remove the one (1) nut holding the convection fan, washers, pipe and the cooling fan to the convection motor shaft.
8. Remove the three (3) screws holding the rear heat cover to the convection fan duct.
9. Remove the two (2) screws holding the convection motor to the rear heat cover.
10. Remove the pipe, washers and the cooling fan from the convection motor shaft.
11. Remove the ring on the convection motor shaft.
12. Now, the convection motor is free.

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[9] POSITIVE LOCK CONNECTOR REMOVAL

1. CARRY OUT 3D CHECKS.
2. Push the lever of positive lock® connector.
3. Pull down on the positive lock® connector.

Figure C-2. Positive lock® connector

CAUTION: WHEN CONNECTING THE POSITIVE LOCK® CONNECTORS TO THE TERMINALS, CONNECT THE POSITIVE LOCK® SO THAT THE LEVER FACES YOU.

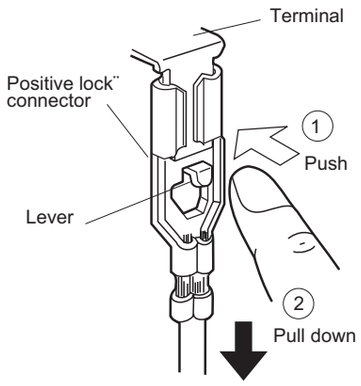
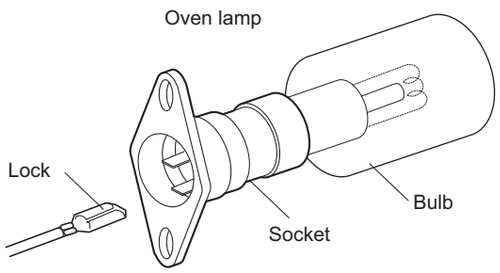


Figure C-2. Positive lock, connector

[10] OVEN LAMP REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the wire leads as Positive lock® connector removal above.
3. Lift up the oven lamp from its retaining clips.

Now, the oven lamp is free.



[11] POWER SUPPLY CORD REPLACEMENT

1. REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the one (1) screw holding the green/yellow wire to the cavity back plate.
3. Disconnect the leads of the power supply cord from the noise filter, referring to the Figure C-3(a).
4. Release the power supply cord from the rear cabinet.
5. Now, the power supply cord is free.

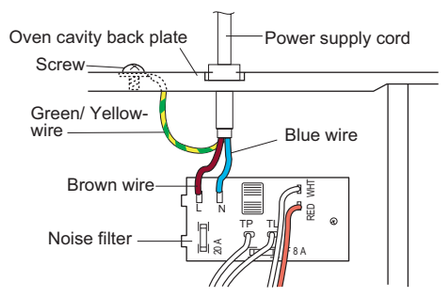


Figure C-3 (a) Power Supply Cord Replacement

2. REINSTALLATION

1. Insert the moulding cord stopper of power supply cord into the square hole of the cavity back plate, referring to the Figure C-3(b).
2. Install the earth wire lead of power supply cord to the oven cavity with one (1) screw and tight the screw.
3. Connect the brown and blue wire leads of power supply cord to the noise filter correctly, referring to the Pictorial Diagram.

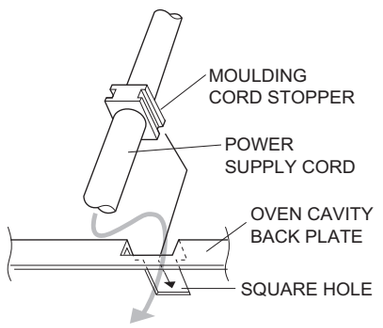


Figure C-3(b). Power Supply Cord Replacement

[12] TOP HEATING ELEMENTS REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the two (2) screws holding the two (2) terminals of the main wire harness to the top heating element.
3. Remove the two (2) screws holding the two (2) grill heater angles to the top of the oven cavity.
4. Remove the two (2) grill heater angles from the oven cavity.
5. Remove the top heating element from the top of the oven cavity.
6. Now the top heating element is free.

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[13] BOTTOM HEATING ELEMENTS REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the turntable motor cover from the base plate, referring to “TURNTABLE MOTOR REPLACEMENT”.
3. Disconnect the wire leads from the bottom heating element.
4. Remove the two (2) nuts holding the heater cover and heater packing to the bottom heater.
5. Remove the heater cover and the heater packing from the bottom heating element.
6. Remove the two(2) nuts holding the bottom heating element to the oven cavity.
7. Remove the bottom heating element from the oven cavity.

[14] CONTROL PANEL ASSEMBLY REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the wire leads and the connectors from the control unit.
3. Remove the one (1) screw holding the control panel assembly to the oven cavity front plate.
4. Lift up the control panel assembly and pull it forward.
   Now the control panel assembly is free.

[15] MONITORED LATCH SWITCH, MONITOR SWITCH AND STOP SWITCH REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the control panel assembly referring to “CONTROL PANEL ASSEMBLY REMOVAL”.
3. Disconnect the leads from all switches.
4. Remove the two (2) screws holding the latch hook to the oven cavity.
5. Remove the latch hook.
6. Remove the switch(es) from the latch hook by pushing the retaining tab backwards slightly and turning the switch(es) on the post.
7. Now the switch(es) is free

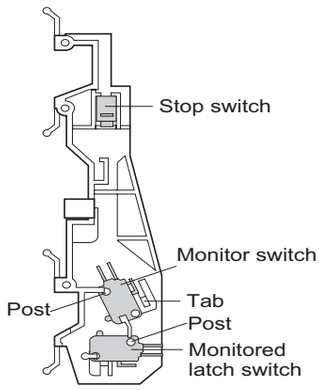

Figure C-4. Switches

[16] MONITORED LATCH SWITCH, STOP SWITCH AND MONITOR SWITCH ADJUSTMENT

If the monitored latch switch, stop switch and monitor switch do not operate properly due to a mis-adjustment, the following adjustment should be made.

1. Adjustment

1. CARRY OUT 3D CHECKS.
2. Loosen the two (2) screws holding the latch hook to the oven cavity front flange.
3. With the door closed, adjust the latch hook by moving it back and forward or up and down. In and out play of the door allowed by the latch hook should be less than 0.5mm. The horizontal position of the latch hook should be placed where the monitor switch has activated with the door closed. The vertical position of the latch hook should be placed where the monitored latch switch and stop switch have activated with the door closed.
4. Secure the screws with washers firmly.
5. Make sure of the all switches operation. If the latch head has not pushed the plungers of the monitor switch with door closed, adjust the latch hook position. At that time, the latch head should have pushed the plungers of the monitored latch switch and stop switch. If the latch head has not pushed the plungers of the monitored latch switch and stop switch with door closed, loose two (2) screws holding latch hook to oven cavity front flange and adjust the latch hook position.

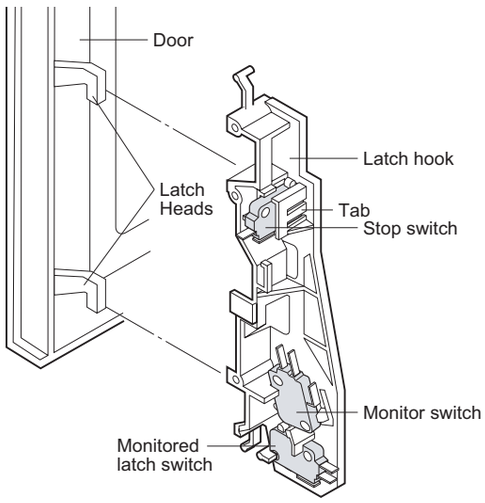

Figure C-5 Latch Switches Adjustment

2. After adjustment, make sure of following:

1. In and out play of door remains less than 0.5mm when latched position. First check the latch hook position, pushing and pulling upper portion of the door toward the oven face. Then check the lower latch hook position, pushing and pulling lower portion of the door toward the oven face. Both results (play of the door) should be less than 0.5mm.

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2. The contacts (COM-NO) of the stop switch and the monitored latch switch open within 1.8mm gap between right side of cavity face plate and door when door is opened.
3. When the door is closed, the contacts (COM-NO) of the stop switch close.
4. When the door is closed the contacts (COM-NC) of the monitor switch and monitored latch switch open. And the contacts (COM-NO) of their switches close.
5. Re-install outer case and check for microwave leakage around the door with an approved microwave survey meter. (Refer to Microwave Measurement Procedure.)

[17] DOOR REPLACEMENT

1. REMOVAL

DOOR FRAME ASSEMBLY

1. Disconnect the oven from the power supply.
2. Pull open the door slightly.
3. Insert a putty knife (thickness of about 0.5mm) into the gap between the choke cover and door frame as shown in Figure C-6 to free engaging parts.
4. Release choke cover from door panel.
5. Now choke cover is free.

NOTE: When carrying out any repair to the door, do not bend or warp the slit choke (tabs on the door panel assembly) to prevent microwave leakage.

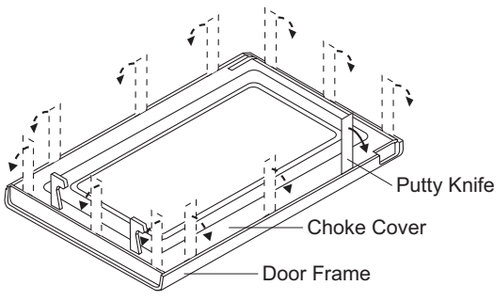


Figure C-6. Door Disassembly

6. Lift the door upwards.
7. Now, door frame assembly is free from oven cavity.

DOOR PANEL

8. Remove the four (4) screws holding the door panel to the door frame.
9. Now, door panel is free.

LATCH HEAD AND SPRING

10. Slide latch head upward and remove it from door frame with releasing latch spring from door frame and latch head.
11. Now, latch head and latch spring are free.

DOOR HANDLE AND FRONT DOOR GLASS

12. Remove the two (2) screws holding the door handle and the door handle base to the door frame.
13. Now, the door handle is free.
14. Remove the three (3) screws holding the door handle base to the door frame.
15. Remove the door handle base and handle decoration from the door frame by sliding rightwards.
16. Remove the front door glass from the door frame by sliding rightwards.
17. Now, the front door glass is free.

2. REINSTALLATION

1. Insert the front door glass to the door frame.
2. Insert the door handle base and handle decoration into the door frame.
3. Hold the door handle base and handle decoration to the door frame with the three (3) screws.
4. Reinstall the door handle and the door handle base to the door frame with the two (2) screws.
5. Reinstall the latch spring to the latch head. Re-install the latch spring to the door frame. Re-install latch head to door frame.
6. Reinstall door panel to door frame.
7. Hold the door panel to the door frame with four (4) screws.
8. Located door panel hinge pins into cavity hinge location hole.
9. Reinstall choke cover to door panel by clipping into position.

NOTE: **After any service to the door;**

1) **Make sure that the monitor switch, monitored latch switch and stop switch are operating properly (Refer to chapter "Test Procedures".).**
2) **An approved microwave survey meter should be used to assure compliance with proper microwave radiation emission limitation standards (Refer to Microwave Measurement Procedure.).**

3. After any service, make sure of the following:

1. Door latch heads smoothly catch latch hook through latch holes and that latch head goes through centre of latch hole.
2. Deviation of door alignment from horizontal line of cavity face plate is to be less than 1.0mm.
3. Door is positioned with its face pressed toward cavity face plate.
4. Check for microwave leakage around door with an approved microwave survey meter (Refer to Microwave Measurement Procedure.).

NOTE: The door on a microwave oven is designed to act as an electronic seal preventing the leakage of microwave energy from oven cavity during cook cycle. This function does not require that door be air-tight, moisture (condensation)-tight or light-tight. Therefore, occasional appearance of moisture, light or sensing of gentle warm air movement around oven door is not abnormal and do not of themselves, indicate a leakage of microwave energy from oven cavity.

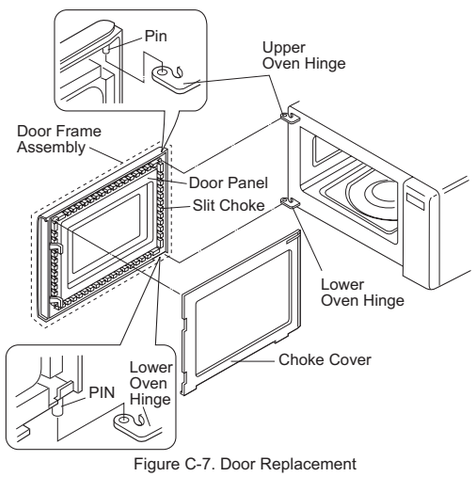


Figure C-7. Door Replacement

CHAPTER 12. MICROWAVE MEASUREMENT

After any repair, the microwave oven must be checked for microwave leakage to ensure continued safe operation. BS EN 60335-2-25 specifies that the maximum permitted leakage with a load of 275 ml is 50 W/m^2 (equivalent to 5 mW/cm^2) at a distance of 5 cm from the oven.

PREPARATION

The following items are required to carry out this test:

1. A low form of 600 ml beaker made from an electrically non-conductive material, such as glass or plastic, with an inside diameter of approximately 8.5 cm. This must contain 275 ± 15 ml of water, at an initial temperature of 20 ± 2°C.
2. A leakage detector which has been calibrated within the preceding 12 months to a stand whose accuracy can be traced to National Physical Laboratory Standards.

Recommended instruments are:

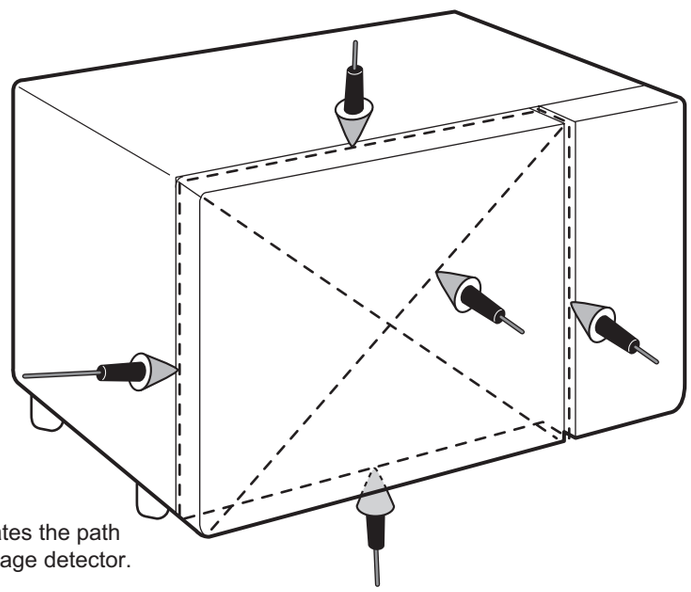
Apollo “XI”

Celtec “A100”

Before commencing the test, check that the leakage detector is functioning and adjusted according to the manufacturer’s instructions, and any spacers are fitted to ensure that measurement is taken 5cm from the surface of the oven.

PROCEDURE

3. Place the beaker containing the water load in the oven cavity at the centre of the turntable. The placing of this standard load in the oven is important, not only to protect the oven, but also to ensure that any leakage it is not disguised by too large a load absorbing energy.
4. Close the oven door, and with the power level set to FULL, turn the oven ON with the timer set for a few minutes operation. Should the water begin to boil before the test has been completed, it should be replaced.
5. As shown in the diagram below, move the probe slowly (not faster than 2.5 cm/sec.);
   1) around the edge of the door following the gap
   2) across the face of the door
   3) across any vents in the oven’s sides, rear or top



Dotted line indicates the path taken by the leakage detector.

Microwave leakage measurement at 5cm distance

Whilst the maximum leakage permitted in BS EN 60335-2-25 is 50 W/m^2 (equivalent to 5 mW/cm^2), it is not normal to detect any significant leakage, and therefore any detected leakage should be investigated.

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CHAPTER 13. CIRCUIT DIAGRAMS

[1] Oven Schematic

SCHEMATIC

NOTE: CONDITION OF OVEN

1. DOOR CLOSED.
2. PLUGGED IN OVEN.
3. NOTHING APPEARS ON DISPLAY.

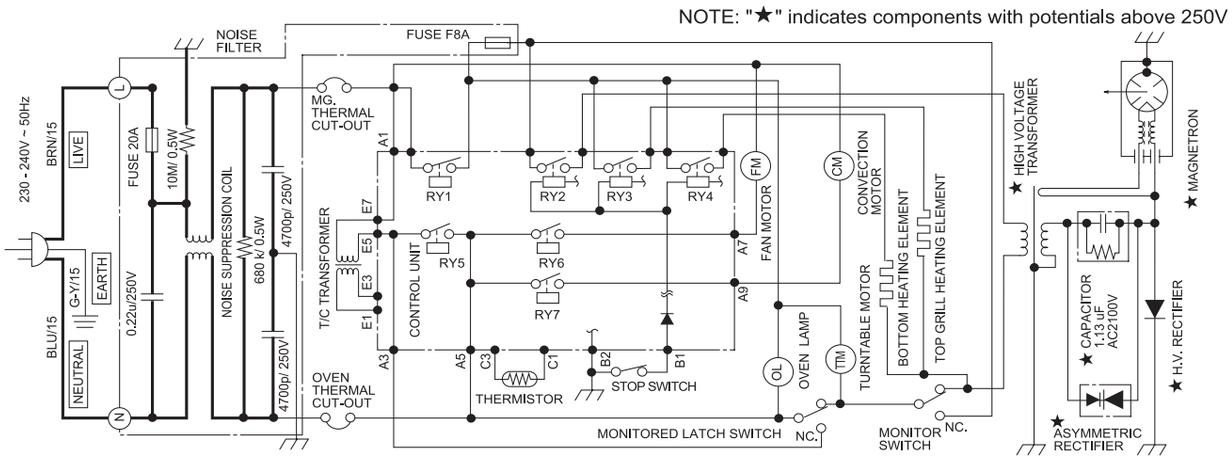

Figure O-1(a) Oven Schematic-OFF Condition right after the oven is plugged in.

SCHEMATIC

NOTE: CONDITION OF OVEN

1. DOOR OPENED.
2. “ENERGY SAVED MODE TO CANCEL ENERGY SAVED MODE SET THE CLOCK” APPEARS ON DISPLAY.

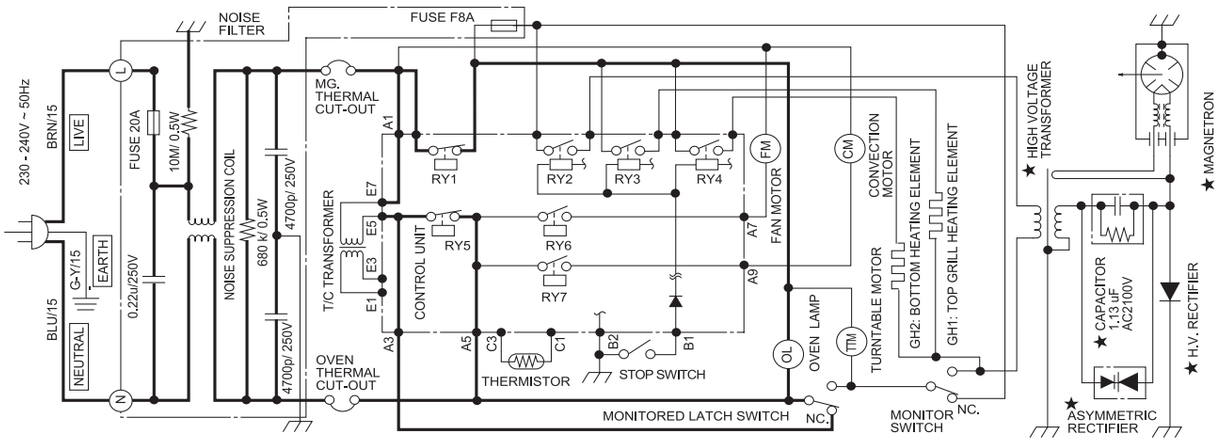

Figure O-1(b) Oven Schematic-OFF Condition when the oven door is opened.

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SCHEMATIC

NOTE: CONDITION OF OVEN
1. DOOR CLOSED.
2. “O” APPEARS ON DISPLAY.

NOTE: "★" indicates components with potentials above 250V

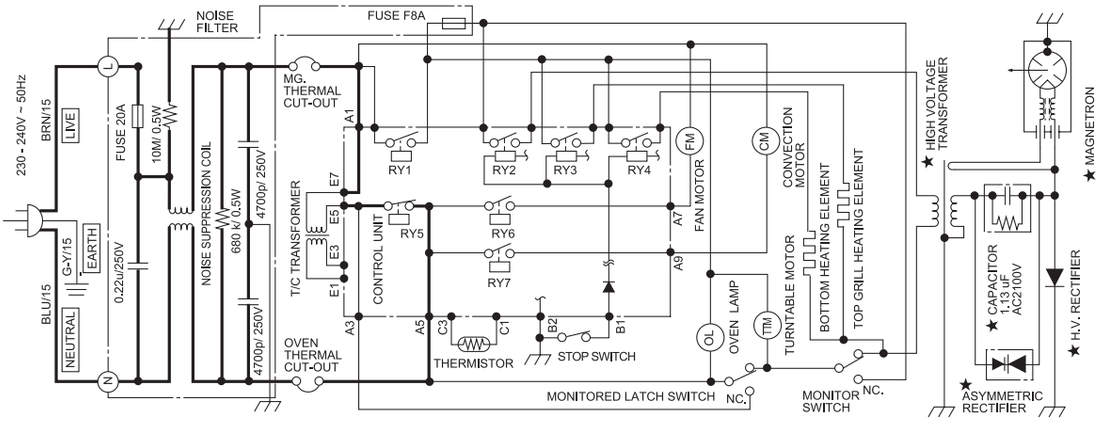

Figure O-1(c) Oven Schematic-OFF Condition after the oven door is closed.

SCHEMATIC

NOTE: CONDITION OF OVEN
1. DOOR CLOSED. 2. MICROWAVE MODE SET. 3. COOKING TIME SET. 4. START BUTTON PRESSED.

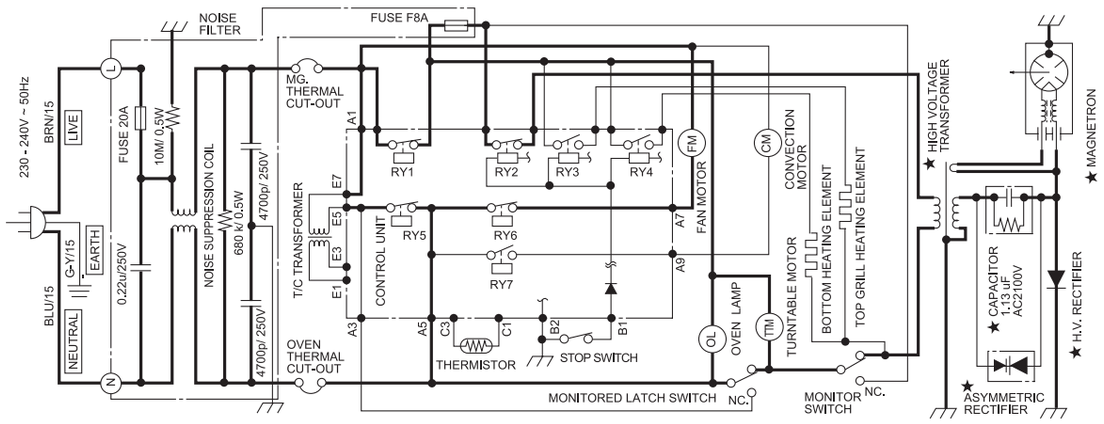

Figure O-2 Oven Schematic-Microwave cooking Condition

SCHEMATIC

NOTE: CONDITION OF OVEN
1. DOOR CLOSED. 2. TOP GRILL MODE SET. 3. COOKING TIME SET. 4. START BUTTON PRESSED.

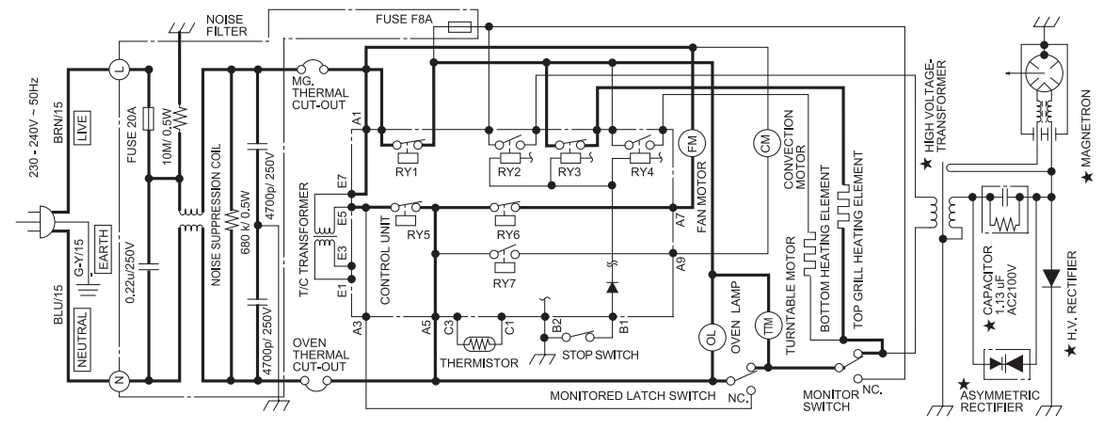

Figure O-3(a) Oven Schematic-Grill-1 cooking Condition (TOP GRILL mode)

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SCHEMATIC

NOTE: CONDITION OF OVEN
1. DOOR CLOSED.
2. BOTTOM GRILL MODE SET.
3. COOKING TIME SET.
4. START BUTTON PRESSED.

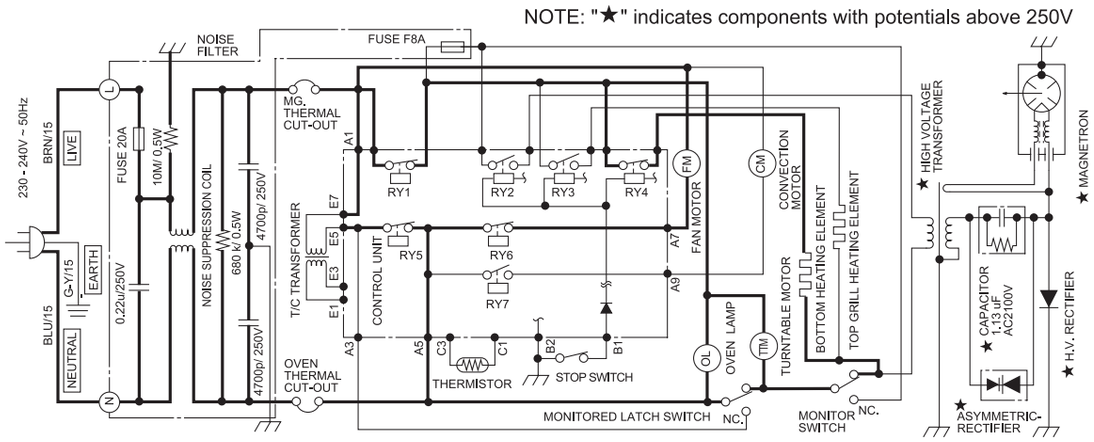

Figure O-3(b) Oven Schematic-Grill-2 cooking Condition (BOTTOM GRILL mode)

SCHEMATIC

NOTE: CONDITION OF OVEN
1. DOOR CLOSED.
2. TOP & BOTTOM GRILL MODE SET.
3. COOKING TIME SET.
4. START BUTTON PRESSED.

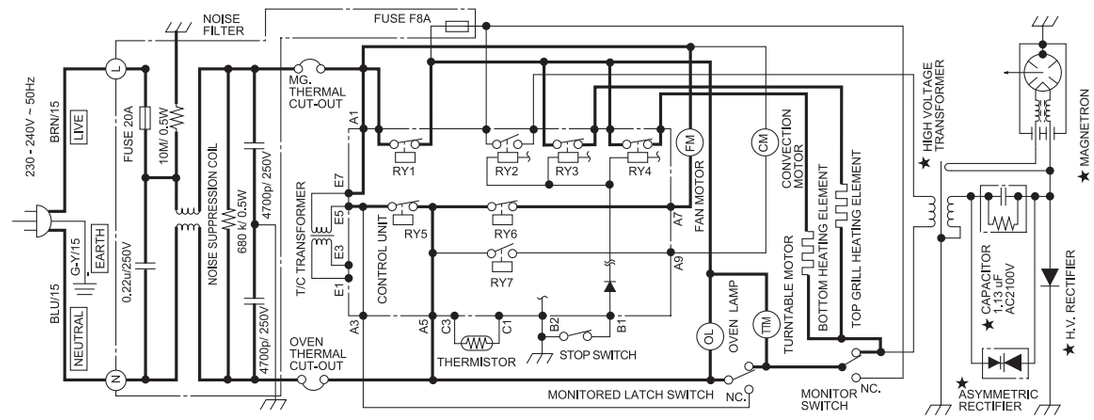

Figure O-3(c) Oven Schematic-Grill-3 cooking Condition (TOP AND BOTTOM GRILL mode)

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SCHEMATIC

NOTE: CONDITION OF OVEN

1. DOOR CLOSED.
2. CONVECTION MODE SET.
3. COOKING TIME SET.
4. CONVECTION TEMPERATURE SELECTED.
5. START BUTTON PRESSED.

NOTE: The top heating element, bottom heating element, fan motor and convection motor will be turned on and off according to the temperature. See “AUTO POWER CONTROL OPERATION”.

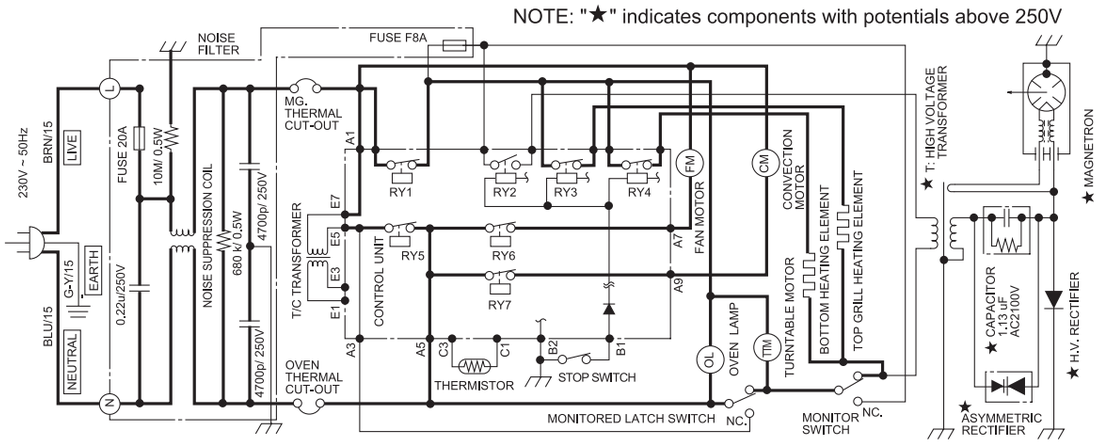

Figure O-4 Oven Schematic-Convection Condition

SCHEMATIC

NOTE: CONDITION OF OVEN

1. DOOR CLOSED.
2. COMBI 1 MODE SET.
3. COOKING TIME SET.
4. MICROWAVE POWER LEVEL SET.
5. CONVECTION TEMPERATURE SELECTED.
6. START BUTTON PRESSED.

NOTE: The top heating element, bottom heating element, magnetron, fan motor and convection motor will be turned on and off according to the temperature or microwave power level. See “AUTO POWER CONTROL OPERATION”.

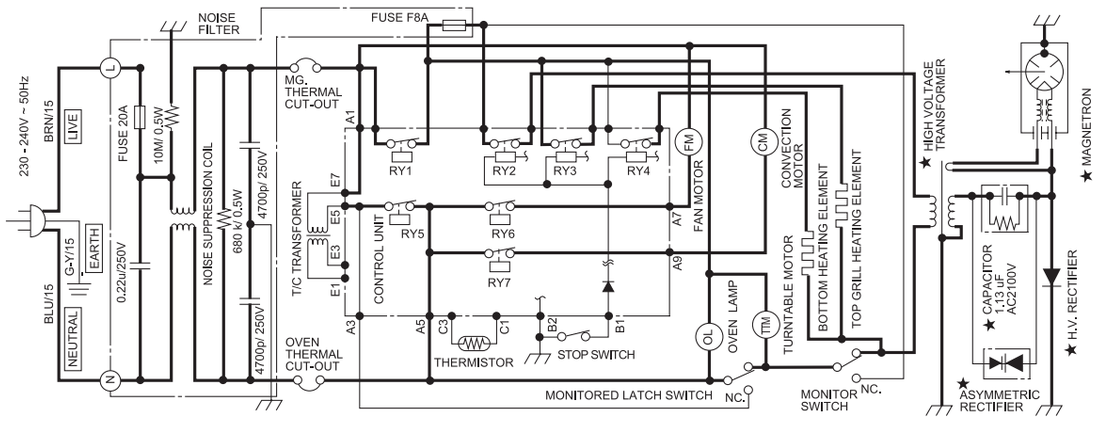

Figure O-5(a) Oven Schematic-COMBI-1 cooking Condition (Microwave and Convection mode)

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SCHEMATIC

NOTE: CONDITION OF OVEN
1. DOOR CLOSED.
2. COMBI 2 MODE SET.
3. COOKING TIME SET.
4. MICROWAVE POWER LEVEL SET.
5. START BUTTON PRESSED.

NOTE: "★" indicates components with potentials above 250V

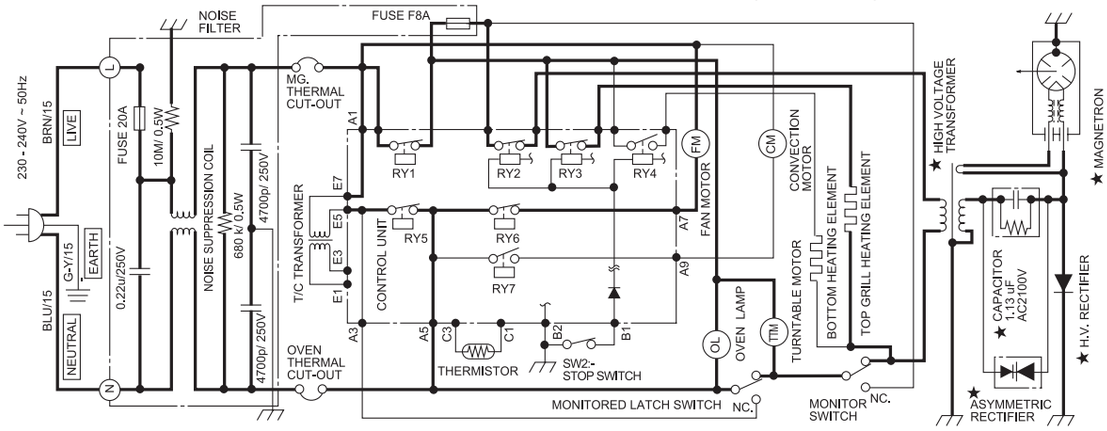

Figure O-5(b) Oven Schematic-COMBI-2 cooking Condition (Microwave and Top Grill mode)

SCHEMATIC

NOTE: CONDITION OF OVEN
1. DOOR CLOSED.
2. COMBI 3 MODE SET.
3. COOKING TIME SET.
4. MICROWAVE POWER LEVEL SET.
5. START BUTTON PRESSED.

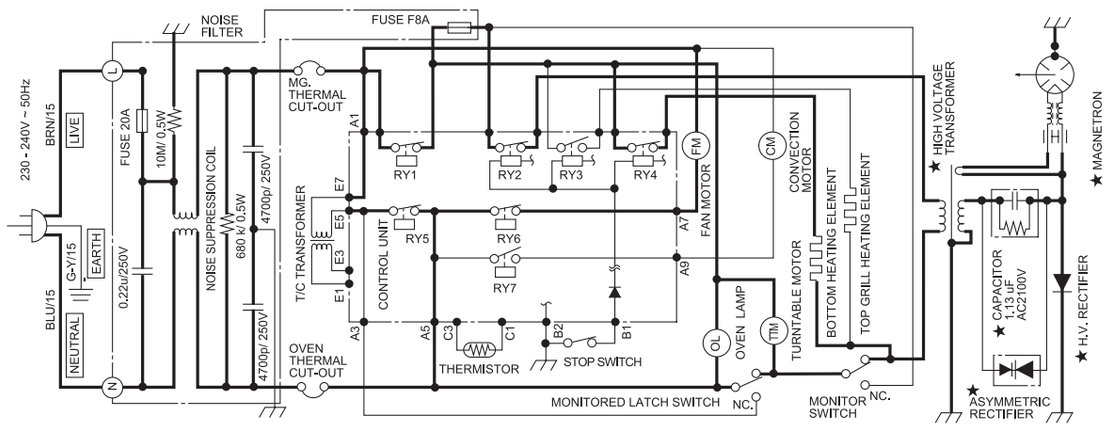

Figure O-5(c) Oven Schematic-COMBI-3 cooking Condition (Microwave and Bottom Grill mode)

[2] Pictorial Diagram (Figure S-1)

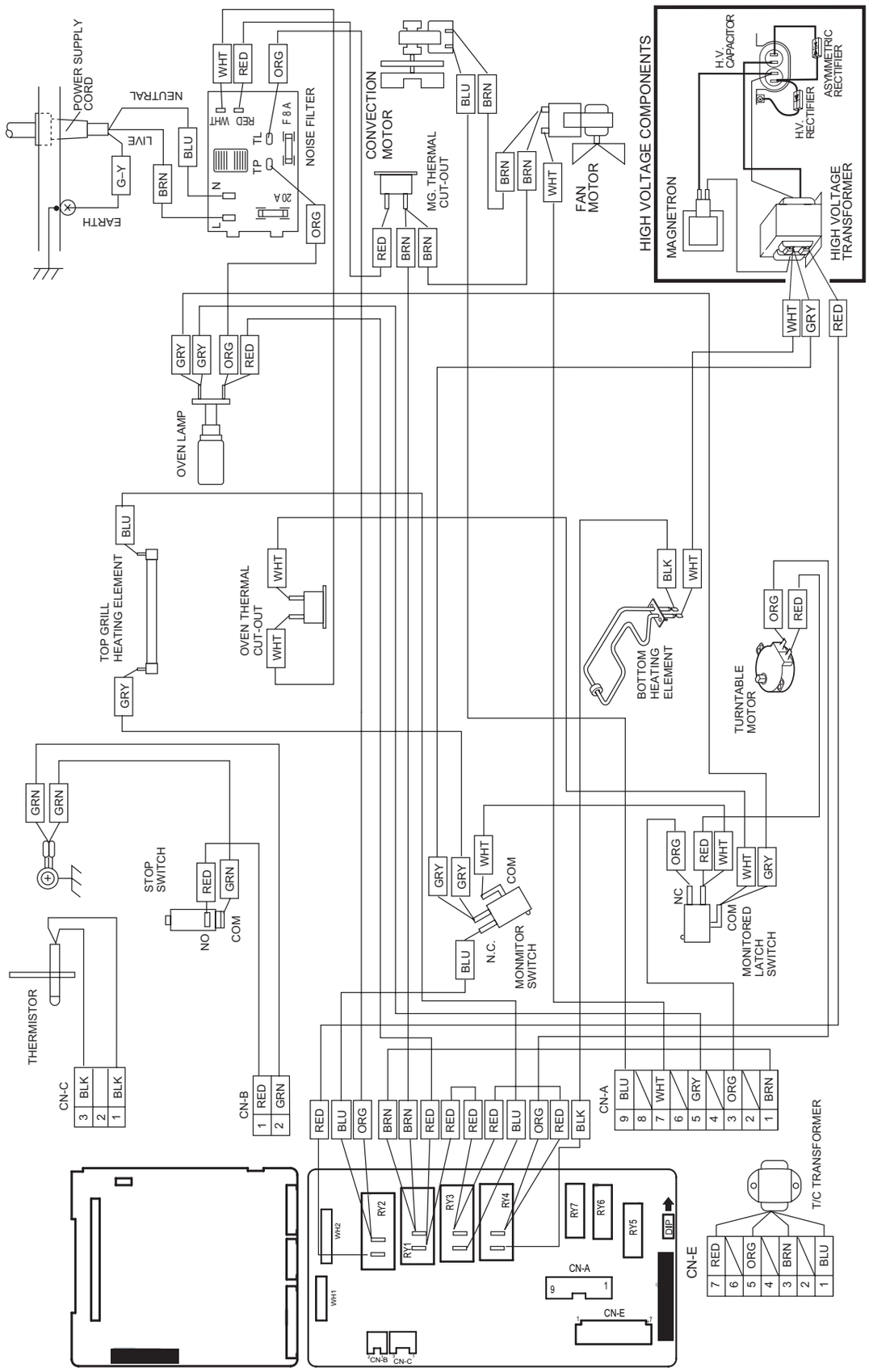

Figure S-1. Pictorial Diagram

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[3] Control Unit Circuit

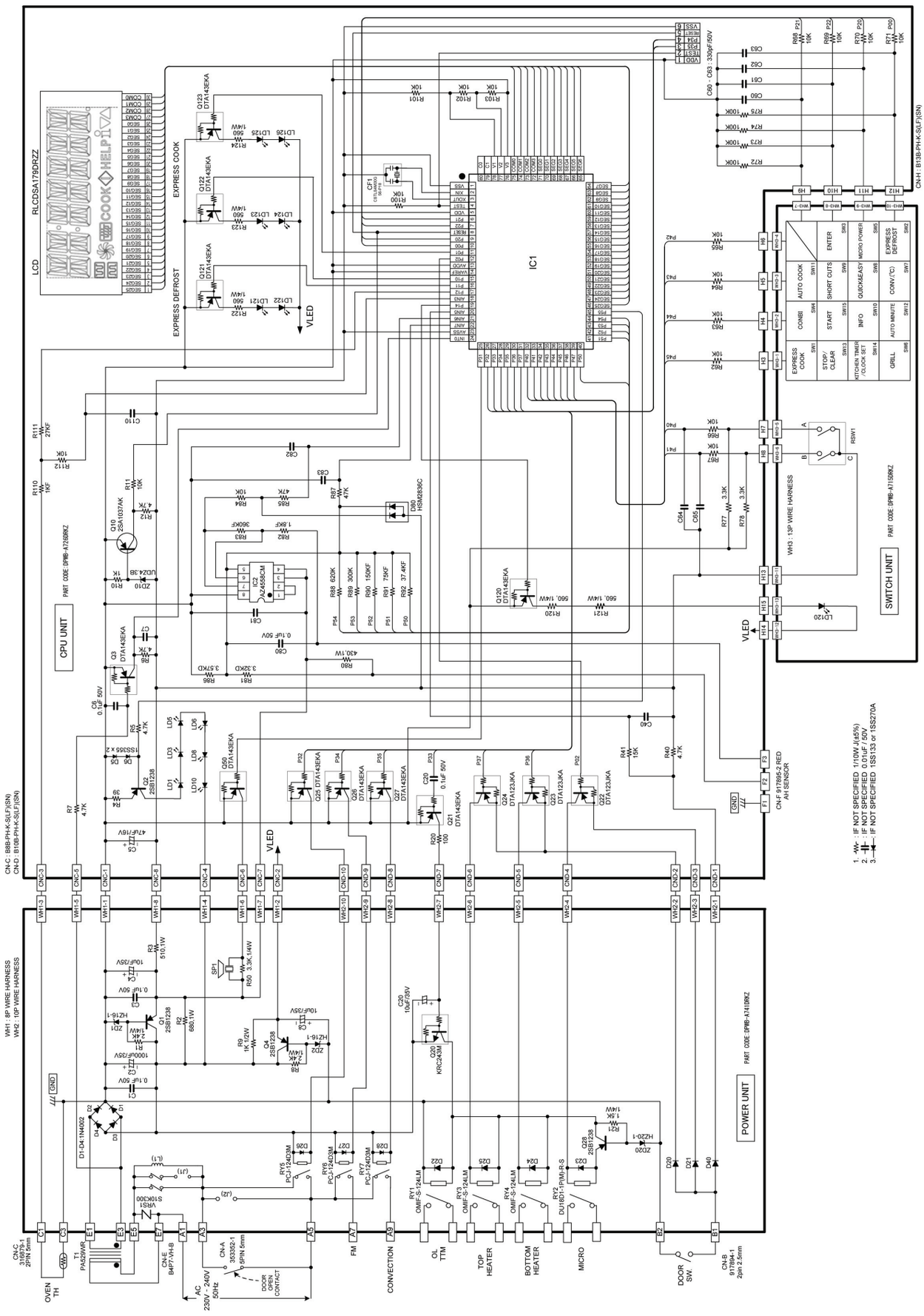

Figure S-2. Control Unit Circuit

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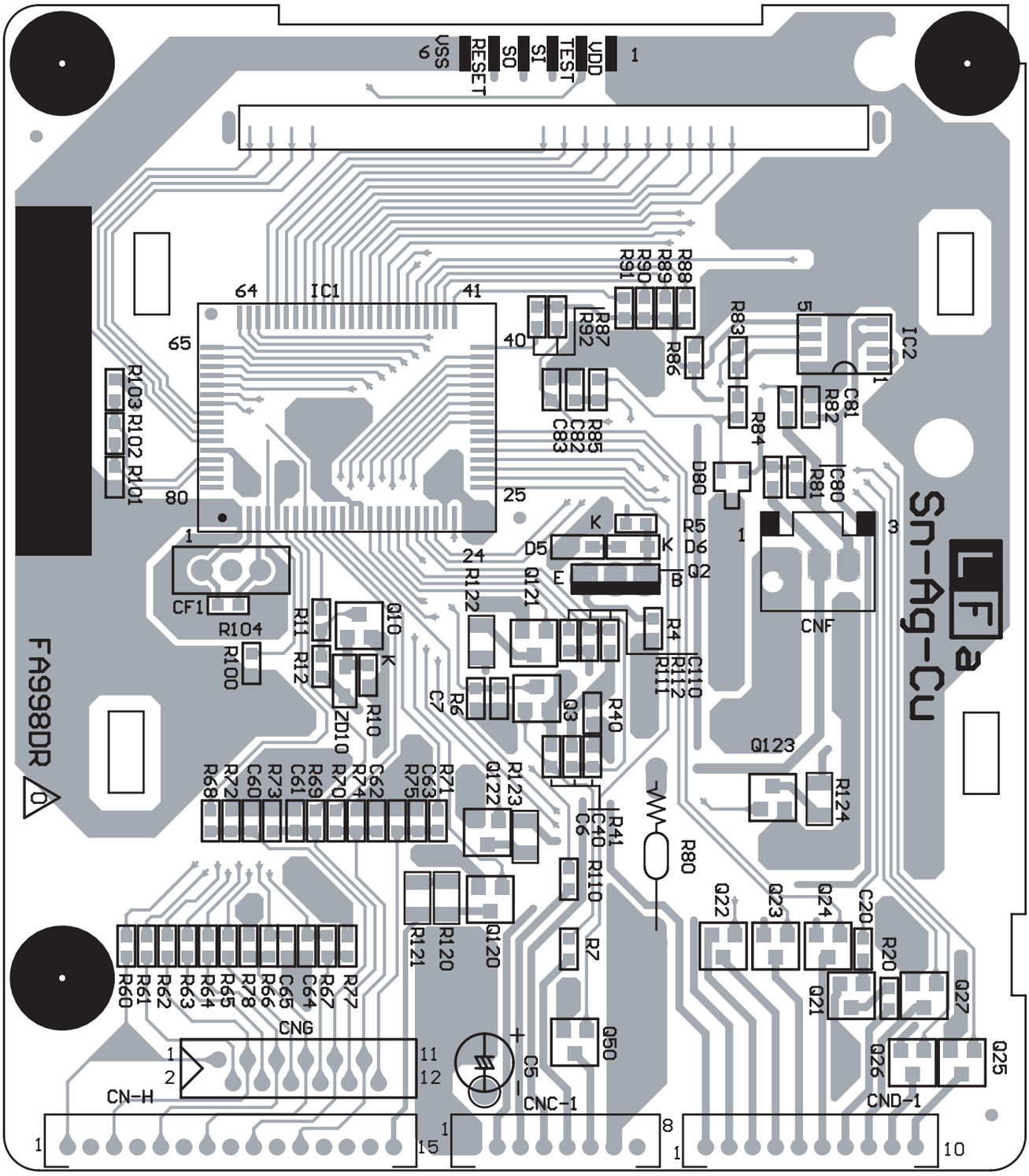
[4] Printed Wiring Board of Control Unit



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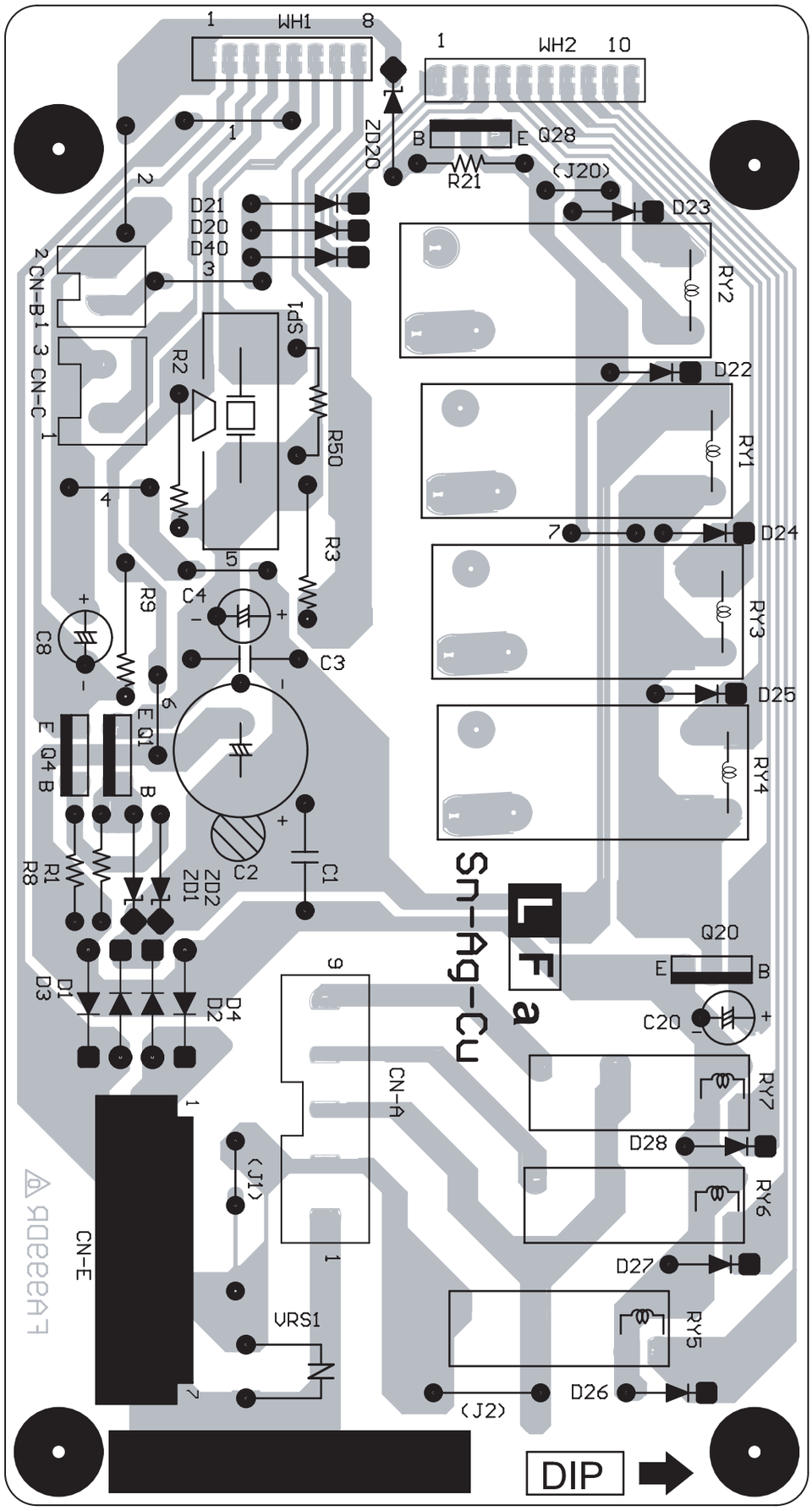
[5] Printed Wiring Board of Power Unit



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[6] Printed Wiring Board of Switch Unit

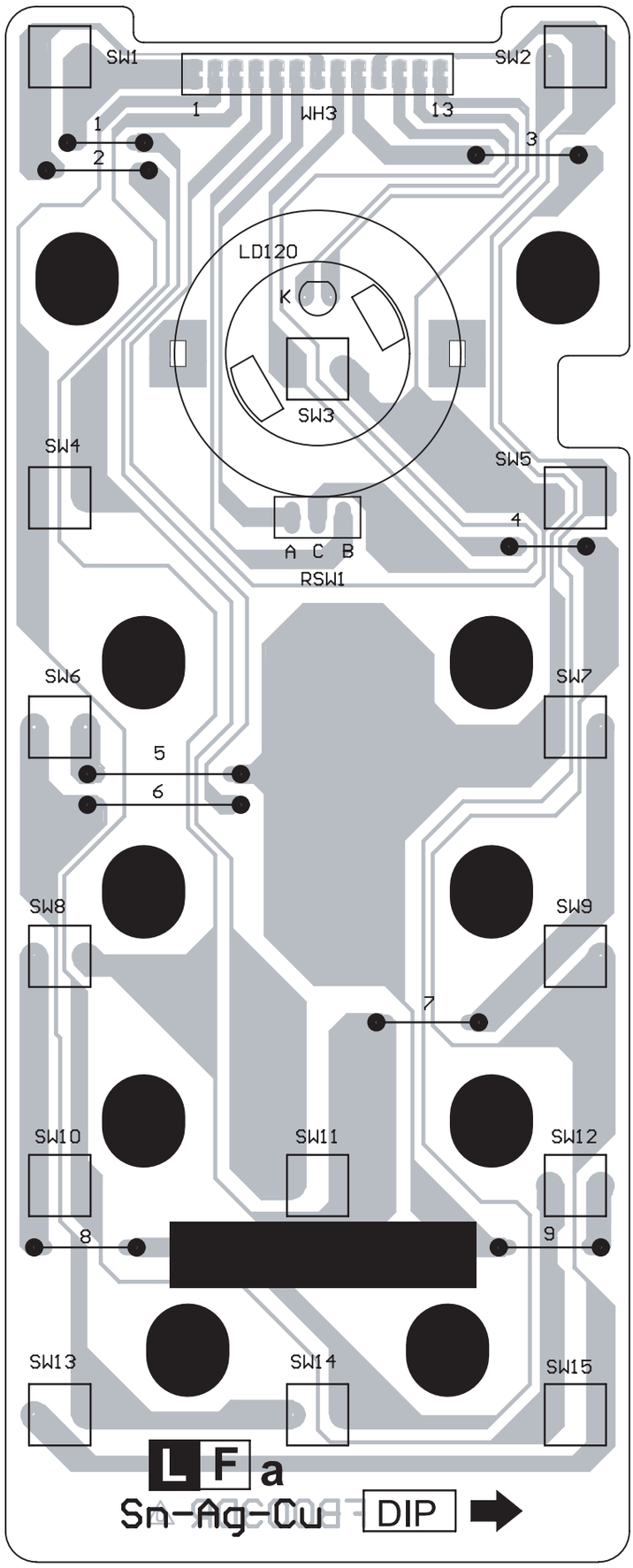


Figure S-3. Printed Wiring Board of Switch Unit

SHARP PARTS LIST

MICROWAVE OVEN WITH GRILL AND CONVECTION

MODELS R-890SLM

HOW TO ORDER REPLACEMENT PARTS

To have your order filled promptly and correctly, please furnish the following information.

1. MODEL NUMBER
2. REF. NO.
3. PART NO.
4. DESCRIPTION

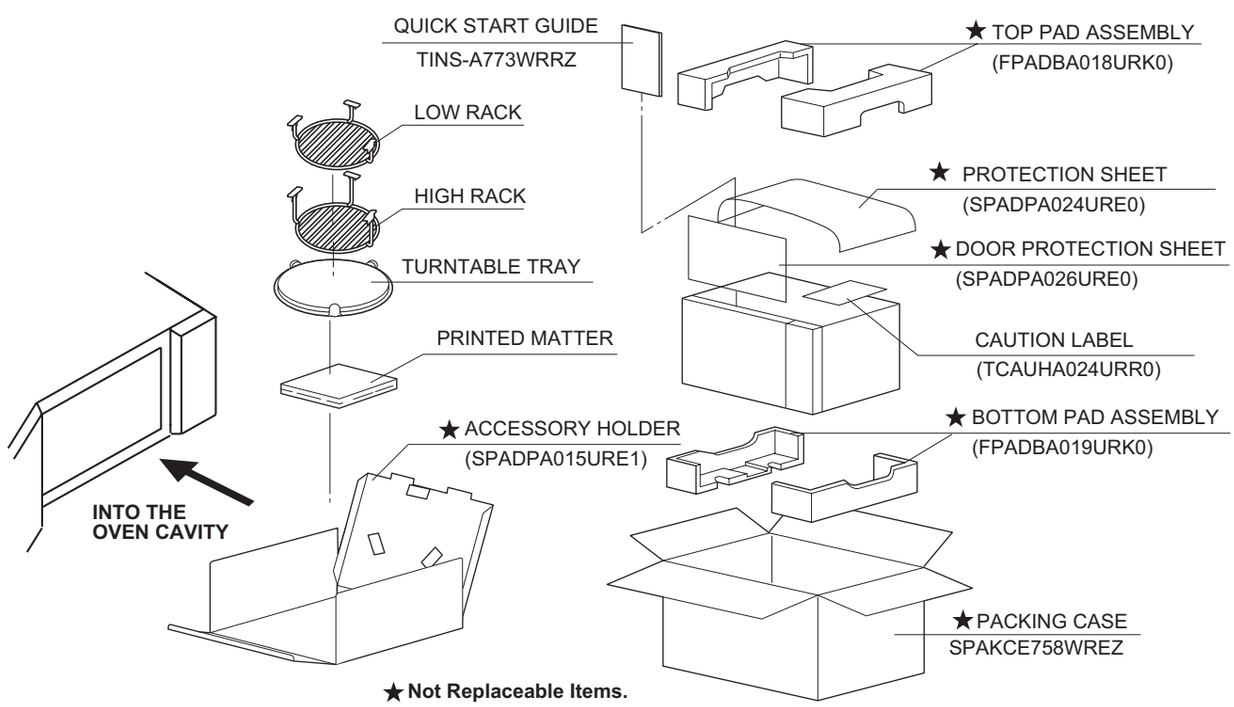
Parts marked "*" may cause undue microwave exposure.
Parts marked "⚠" are used in voltage more than 250V.

CONTENTS

[1] OVEN PARTS

[2] DOOR AND CONTROL PANEL PARTS

■ INDEX

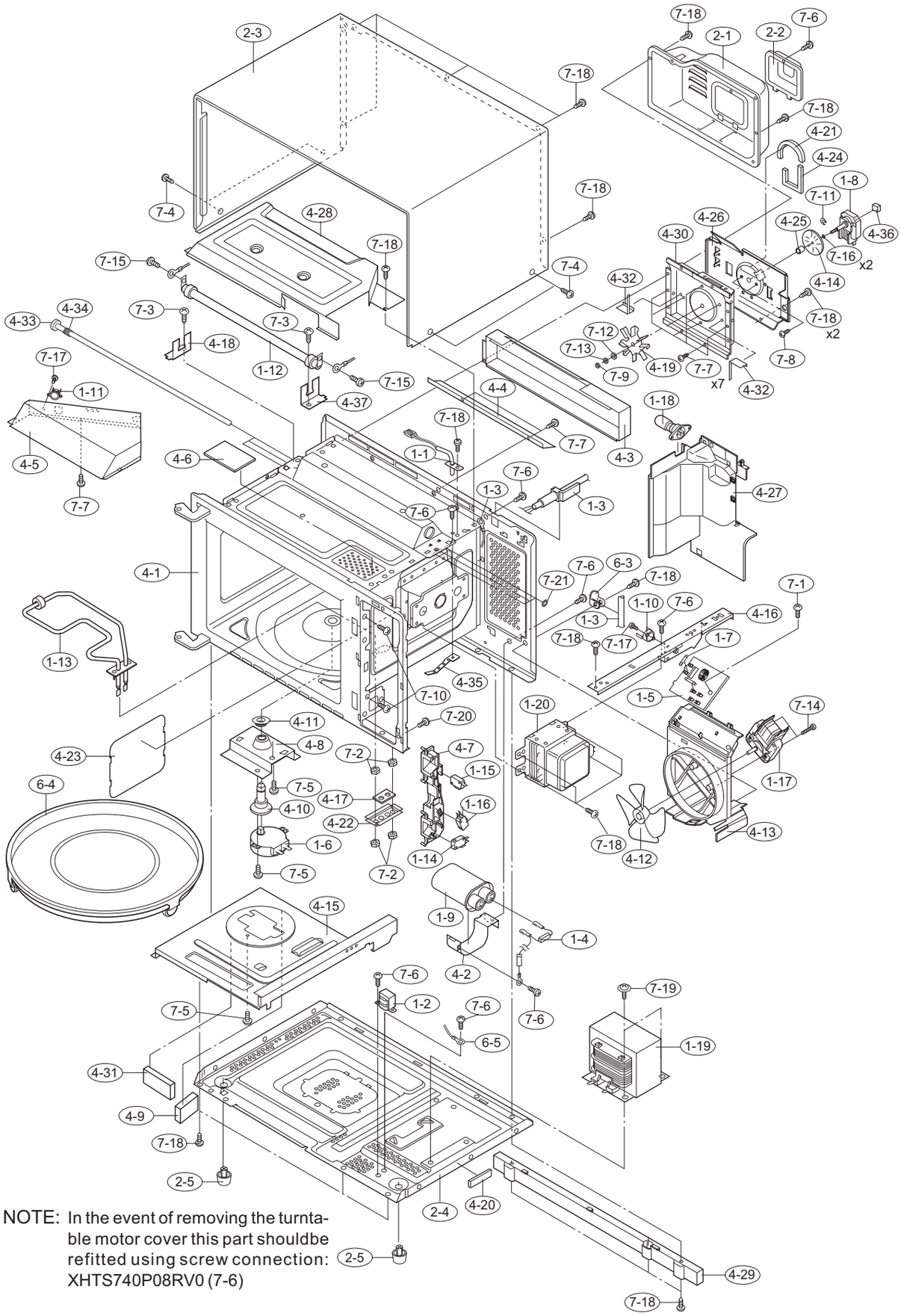


★ Not Replaceable Items.

SHARP CORPORATION

This document has been published to be used for after sales service only.
The contents are subject to change without notice.

[1] OVEN PARTS



NOTE: In the event of removing the turntable motor cover this part shouldbe refitted using screw connection: XHTS740P08RV0 (7-6)

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PARTS LIST

	NO.	PARTS CODE	DESCRIPTION	Q'TY	PRICE RANK
	[1] OVEN PARTS				
	ELECTRIC PARTS				
	1-1	FH-HZA075WRE0	Thermistor	1	AS
	1-2	RTRN-A529WRE1	TC transformer	1	AW
	1-2	RTRN-A529WRE0	TC transformer (Interchangeable)	1	--
	1-3	QACCBA004URE5	Power supply cord	1	AV
⚠	1-4	FH-DZA135WRZZ	High voltage rectifier assembly	1	AS
⚠	1-4	FH-DZA035WRE1	High voltage rectifier assembly (Interchangeable)	1	AS
	1-5	FPWBFA309WRE4	Noise filter (including fuse F8A)	1	AT
	1-6	RMOTDA255WRZZ	Turntable motor	1	AP
	1-6	RMOTDA289WRZZ	Turntable motor (Interchangeable)	1	
	1-7	QFS-BA012WRZZ	Fuse 20A	1	AG
	1-7	QFS-BA009WRE0	Fuse 20A (Interchangeable)	1	AH
	1-8	RMOTEA373WRE1	Convection motor	1	AZ
⚠	1-9	RC-QZA240WRE2	High voltage capacitor	1	AS
⚠	1-9	RC-QZA240WRE1	High voltage capacitor (Interchangeable)	1	AS
⚠	1-9	RC-QZA352WRZZ	High voltage capacitor (Interchangeable)	1	--
	1-10	RTHM-A098WRE0	Thermal cut-out 125ºC off(MG)	1	AK
	1-11	RTHM-A124WRZZ	Thermal cut-out 145ºC off 115ºC on (OVEN)	1	AL
	1-12	RHET-A255WRZ1	Top grill heating element	1	AY
	1-13	RHET-A248WRZ2	Bottom grill heating element	1	AY
	1-14	QSW-MA087WRE0	Monitored latch switch	1	AF
	1-14	QSW-MA146WRZ1	Monitor latch switch (Interchangeable)	1	AM
	1-15	QSW-MA085WRE0	Stop switch	1	AF
	1-15	QSW-MA147WRZ1	Stop switch (Interchangeable)	1	AM
	1-16	QSW-MA087WRE0	Monitor latch switch	1	AF
	1-16	QSW-MA146WRZ1	Monitor latch switch (Interchangeable)	1	AM
	1-17	RMOTEA002URE2	Fan motor	1	AV
	1-18	RLMPTA097WRZZ	Oven lamp	1	AQ
	1-18	RLMPTA066WRE1	Oven lamp (Interchangeable)	1	AP
⚠	1-19	RTRN-A021URE0	High voltage transformer	1	BN
⚠*	1-20	RV-MZA327WRZ1	Magnetron	1	BH
	CABINET PARTS				
	2-1	GCABDA001URP3	Back plate	1	AW
	2-2	GCABDA002URP1	Sub back plate	1	AN
	2-3	GCABUW024URP0	Outer case cabinet	1	BH
	2-4	GDAI-A002URP0	Base plate	1	AW
	2-5	GLEGPA057WRE2	Foot	2	AF
	OVEN PARTS				
*	4-1	DOVN-A658WRKZ	Oven cavity	1	BS
	4-2	LBNDKA107WRP1	Capacitor holder	1	AF
	4-3	FDUC-A003URY1	Air duct assembly	1	AT
	4-4	LANGQA005URP1	Air separate angle B	1	AE
	4-5	PDUC-A636WRP1	Air guide duct	1	AM
	4-6	PFILWA001URP0	Lamp filter	1	AG
*	4-7	PHOK-A002URF1	Latch hook	1	AT
	4-8	LANGQA014URP1	Turntable motor angle	1	AF
	4-9	PCUSUA019URE0	Cushion	1	AD
	4-10	FANGTA003URY3	Turntable motor shaft assembly	1	AN
	4-11	PPACGA002URE0	Seal packing	1	AF
	4-12	NFANJA038WRE0	Fan blade	1	AG
	4-13	PDUC-A637WRF3	Fan duct	1	AN
	4-14	NFANMA002URP0	Cooling fan	1	AG
	4-15	GCOVHA001URP1	Bottom heater cover	1	AP
	4-16	LANGFA155WRP8	Chassis support	1	AM
	4-17	PPACGA001URE0	Heater packing	1	AF
	4-18	LANGQA657WRPZ	Grill heater angle	1	AM

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NO.	PARTS CODE	DESCRIPTION	Q'TY	PRICE RANK
4-19	NFANMA001URP0	Convection fan	1	AF
4-20	PSPAGA001WRE0	Vibration proof cushion	1	AB
4-21	PCUSUA006URE0	Air cushion B	1	AD
4-22	PCOVQA002URP1	Heater cover	1	AF
4-23	PCOVPA308WRE1	Waveguide cover	1	AE
4-24	PCUSUA015URE0	Back plate cushion	1	AD
4-25	PPIP-A001UR10	Pipe	1	AL
4-26	PCOVQA001URP1	Rear heat cover	1	AP
4-27	PDUC-A606WRF2	Air intake duct	1	AP
4-28	PDUC-A008URP0	Exhaust duct	1	AN
4-29	PSKR-A308WRF1	Rear barrier	1	AL
4-30	PDUC-B111WRWZ	Convection duct	1	AN
4-31	PCUSUA017URE0	Cushion	1	AE
4-32	LANGQA004URP1	Convection air angle	2	AL
4-33	MROD-A024WREZ	Grill rod	3	AN
4-34	MSPRTA243WREZ	Spring	3	AE
4-35	MSPRTA248WREZ	Spring	1	AF
4-36	PCUSGA317WRP0	Cushion	1	AD
4-37	LANGQA008URP2	Grill heater angle	1	AF
MISCELLANEOUS				
6-3	LHLDKA008WRF1	P-clip	1	AF
6-4	CTNT-A005URK0	Turntable tray	1	BD
6-5	FW-VZA061URE3	Stop switch harness	1	AH
SCREWS/ NUTS AND WASHERS				
7-1	XHPS740P08K00	Screw : 4mm x 8mm	1	AB
7-2	LX-NZ0061WRE0	Nut	4	AA
7-3	LX-CZA076WRE0	Special screw	2	AC
7-4	XOTS740P10000	Screw : 4mm x 10mm	4	AB
7-5	XHPS740P06000	Screw : 4mm x 6mm	3	AB
7-6	XHTS740P08RV0	Screw : 4mm x 8mm	8	AG
7-7	XOTWW40P10000	Screw : 4mm x 10mm	10	AA
7-8	XBBS740P06000	Screw : 4mm x 6mm	2	AA
7-9	XNEUW40-32000	Nut : 4mm x 3.2mm	1	AA
7-10	XOTS740P12RV0	Screw : 4mm x 12mm	2	AD
7-11	XRES740-06000	Ring	1	AB
7-12	XWHUW40-08000	Washer : 4mm x 0.8mm	1	AA
7-13	XWSUW40-10000	Washer : 4mm x 1.0mm	1	AA
7-14	XEPS740P25000	Screw: 4mm x 25mm	2	AB
7-15	LX-BZA144WREZ	Special screw	2	AB
7-16	XWHUW50-08000	Washer : 5mm x 0.8mm	2	AA
7-17	XHPS730P06000	Screw : 3mm x 6mm	2	AB
7-18	LX-CZA001URE0	Special screw	23	AC
7-19	LX-EZA042WRE0	Special screw	2	AB
7-20	XEPS740P08000	Screw : 4mm x 8mm	1	AB
7-21	LX-NZA052WREZ	Special nut	3	AC

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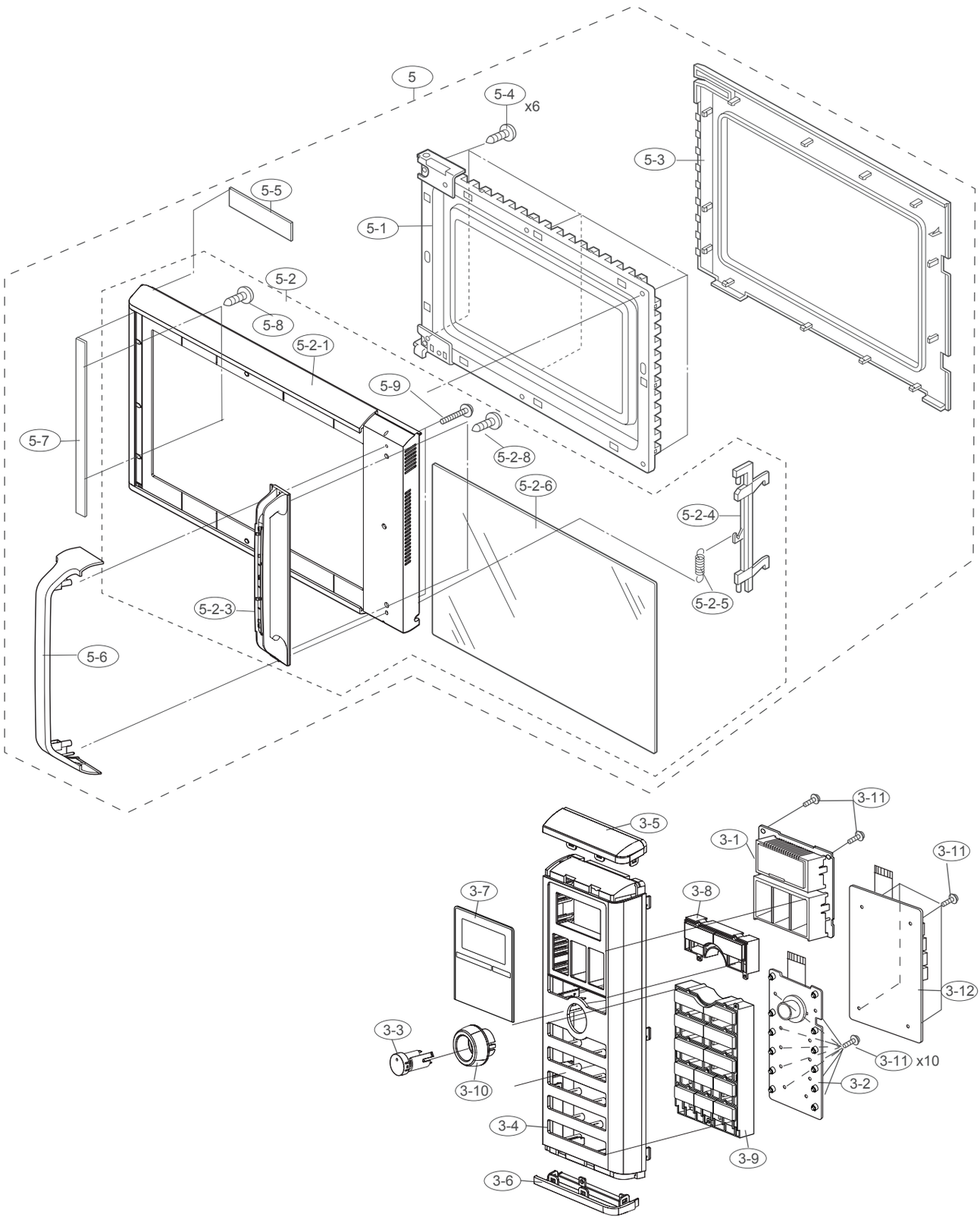
[2] DOOR AND CONTROL PANEL PARTS



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NO.	PARTS CODE	DESCRIPTION	Q'TY	PRICE RANK
[2] DOOR AND CONTROL PANEL PARTS				
CONTROL PANEL PARTS				
3-1	DPWB-A725DRKZ	Control unit	1	BQ
3-2	DPWB-A715DRKZ	Switch unit	1	BQ
3-3	FBTN-A209WRKZ	Push button assy	1	AK
3-4	HPNLCC224WRRZ	Control panel	1	AY
3-5	HDECQA417WRT	Panel cap upper	1	AK
3-6	HDECQA419WRTZ	Panel cap lower	1	AK
3-7	GMADIA211WRRZ	Display window	1	AL
3-8	JBTN-B572WRRZ	Key button A	1	AL
3-9	JBTN-B573WRRZ	Key button B	1	AK
3-10	JKNBKA827WRMZ	Encoder button	1	AK
3-11	XEPS730P08XS0	Screw 3mm x 8mm	17	AA
3-12	DPWB-A741DRKZ	Power unit	1	BQ
DOOR PARTS				
5	CDORFB133WRKZ	Door assembly	1	BR
5-1	DDORFB362WRKZ	Door panel assembly	1	BH
5-2	FWAKPA512WRKZ	Door frame assembly	1	BK
5-2-1	GWAKPB264WRTZ	Door frame	1	AY
5-2-3	JHNDPA331WRFZ	Door handle base	1	AR
5-2-4	LSTPPA017URF0	Latch head	1	AK
5-2-5	MSPRTA197WREZ	Latch spring	1	AF
5-2-6	PGLSPA761WREZ	Front door glass	1	AT
5-2-7	XEPS730P08XS0	Screw : 3mm x 8mm	1	AA
5-2-8	LX-CZA106WREZ	Special screw	2	AC
5-3	GCOVHA365WRF3	Choke cover	1	AS
5-4	XEPS730P08000	Screw : 3mm x 8mm	6	AA
5-5	PCUSGA015URP0	Cushion	1	AF
5-6	HDECQA415WRTZ	Handle decoration	1	AN
5-7	HDECQA412WRFZ	Door sash	1	AL
5-8	XEBS730P08000	Screw : 3mm x 6 mm	2	AC
5-9	XEPS730P10XS0	Screw : 3mm x 10 mm	2	AA
MISCELLANEOUS				
6-1	FAMI-A072WRK3	High rack	1	AS
6-2	FAMI-A095WRK2	Low rack	1	AS
6-5	FW-VZA061URE3	Stop switch harness	1	AH
6-6	TCAUHA024URR0	Caution label	1	AE
6-7	TINS-A769WRRZ	Operation manual	1	AK
6-8	FW-VZA098URE3	Main harness	1	AZ
6-9	TINS-A773WRRZ	Quick start guide	1	AF

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